This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

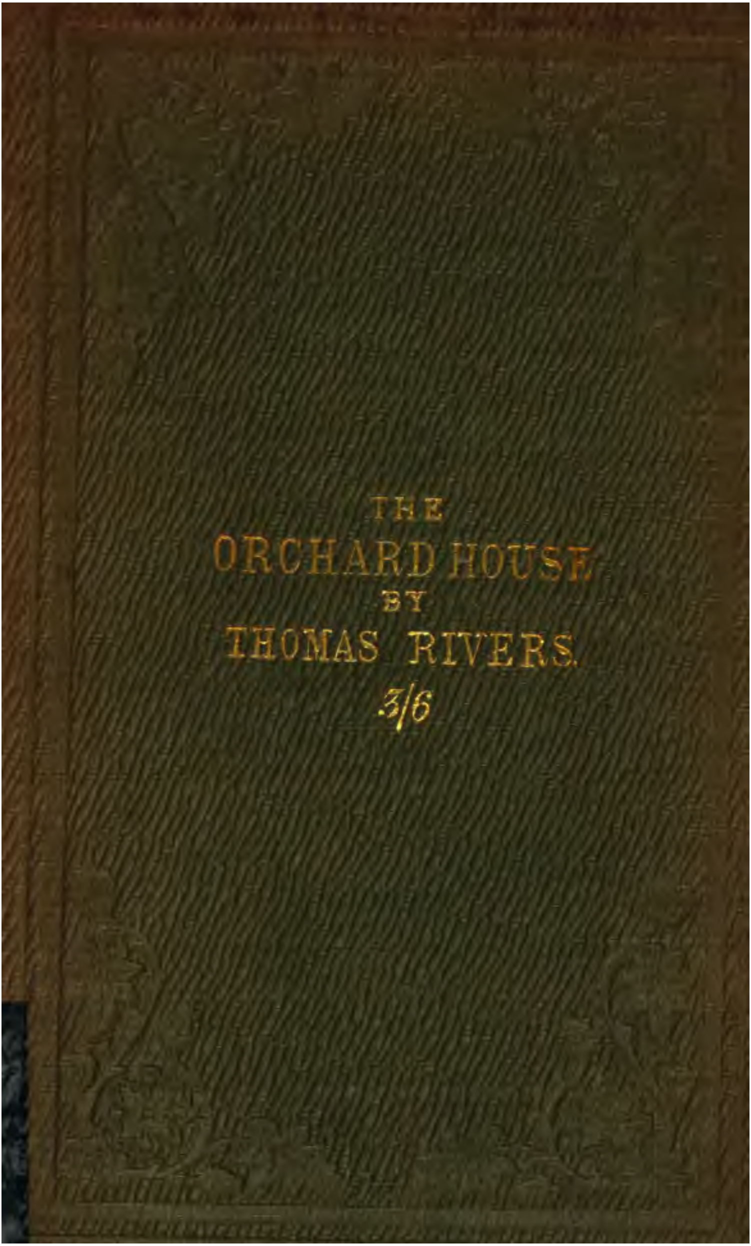
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`



THE
ORCHARD HOUSE
BY
THOMAS RIVERS.
3/6

THE

ORCHARD HOUSE

THE following Works by MR. RIVERS are sold by MESSRS. LONGMAN & CO.; or sent free per post, at the prices quoted, on application to the Author, Sawbridgeworth, Herts :—

THE ROSE AMATEUR'S GUIDE

Giving the History and Description of the finer kinds of Roses: with Directions for their Culture in the Open Air and in Pots. *Sixth Edition*, just published, 3*s*. 6*d*.

THE ORCHARD HOUSE:

On the Culture of Fruit Trees in Pots under Glass. *Eighth Edition*, enlarged and improved, 3*s*. 6*d*.

THE MINIATURE FRUIT GARDEN:

On the Culture of Fruit Trees as Pyramids and Bushes. *Ninth Edition*, enlarged and improved, 2*s*. 6*d*.

A DESCRIPTIVE CATALOGUE of FRUITS

Carefully compiled and arranged, so as to be a complete Guide to the Purchaser of Fruit Trees. *Sixpence.*

A DESCRIPTIVE CATALOGUE of SELECTED ROSES. *Free.*

A DESCRIPTIVE CATALOGUE of a SELECTION of TREES and SHRUBS. *Free.*

THE

ORCHARD HOUSE

OR THE

CULTIVATION OF FRUIT TREES IN POTS UNDER GLASS

BY

THOMAS RIVERS

Eighth Edition

LONDON
LONGMAN, GREEN, LONGMAN, AND ROBERTS
1860

191. c. 117.

LONDON
PRINTED BY SPOTTISWOODE AND CO.
NEW-STREET SQUARE

BIBLIOTHECA BODLEIANA

PREFACE.

In this (the Eighth) edition of the "Vineyard under Glass" is a new idea likely to be of great [illegible] most agreeable

ERRATUM.

In preface, line 1, *for* In this (the Eighth) edition of the "Vineyard, *read* In this (the Eighth) edition, the "Vineyard.

Blood and the thin-rinded St. Michael's Orange, which require the same treatment as the Tangerin, and of the latter of which I have imported young trees of the true sort direct from the island. I feel a firm conviction that orange-tree houses for the production of fruit only, and not as formerly for their cultivation as ornamental trees and shrubs, will ere long be in every good garden.

In the management of Apricot trees in orchard houses, it will be seen that, writing from recent experience, I have directed syringing the trees to be nearly or quite discontinued. I have also made some change in the mode of summer pinching, which will be found advantageous. In the summer pinching of Peach and Nectarine trees I have also made some trifling change as to the time when it should be discontinued. I have, in fact, given all the fruits of my experience up to the time of publication.

I may, I think, venture to suggest that "Tiffany houses," as employed by Mr. Standish, may be found very cheap and useful in the culture of plums, cherries, pears, and even apricots in pots. The trees may remain in the house till their fruit is quite safe from the effects of our spring frosts, say the first week in June, and then be placed in the open air to ripen their fruit. With the ripening power of "Tiffany houses" we are at present unacquainted. If they can be made to serve as efficient protectors of the blossoms of such kinds of fruits as will ripen in the open air, they will be of great service in the fruit-garden. The best form for a house of this kind would be, I apprehend, the span roof, the sides four feet high, the centre six or seven feet. The tiffany for the roof should be fixed; that forming the sides should be loose, so as to admit of its being turned up daily for the admission of fresh air.

August, 1860.

PREFACES TO PREVIOUS EDITIONS.

TO THE FIRST EDITION.

It has been, and is, too often the custom of writers on horticulture and agriculture, to write first and practise afterwards, — in other words, to promulgate a pretty theory and then reduce it to practice: I have not been "to this manner given," for in this instance, as well as in others, I have reduced my practice to writing. The method of culture given in the following pages has been to me a pleasant relaxation from the cares of an extensive business, and I feel convinced that it may be made equally agreeable to a numerous class of busy men, who make their gardens a source of untiring quiet enjoyment.

December, 1850.

TO THE FIFTH EDITION.

WHEN I ventured to publish the first edition of this little work, I scarcely dared to hope that it would meet with a reception so favourable, and fulfil so quickly the purpose to which it was dedicated. Orchard houses are now familiar things: hundreds are rising up all over the face of the country: no garden structures have ever so rapidly advanced in popularity. That they deserve to be popular, I am more than ever convinced; and I cannot help feeling grateful that, through the exercise of my humble literary ability, so much good, because so much intellectual pleasure, has been derived from this new mode of cultivating fruit trees. In the following pages it will be seen that the idea has not "grown with my growth,"—for I am old and grey-headed,—but rather with my age.

We are, however, as yet only children in orchard-house culture. Every moderate-sized garden in England—more particularly in the North—and in Scotland, will, in the course of a few years, have its orchard-house. They will glisten on highland and lowland, and gladden many a garden-lover with their genial climate and varied produce.

In the present edition it will be seen that I recommended top-dressing to be done in the autumn, instead of in spring as heretofore. I have found this to be by far the most eligible season; for, if done too late in spring, it is liable to make the trees shed their blossoms without setting fruit. With apricots, this is more particularly likely to occur. Potted trees, when top-dressed in autumn, commence at once to form fresh roots, which in spring are ready to fulfil their office in supporting the young fruit. Very recently, some cultivators have recommended trees to be shifted and re-potted annually: when they become large, this is a work of much trouble. I can say, with confidence, there is no occasion to do it. My finest trees have now been from seven to nine years in the same pots, and they bear large crops of very fine fruit every season.

March, 1858.

TO THE SIXTH EDITION.

In the fifth edition, the cultivation of peaches and nectarines as close pyramids was recommended. This method has proved so highly successful, that in the present edition I have gone more fully into it, believing it likely to make quite a revolution in orchard-house culture.

The pruning of orchard-house trees is a most simple operation, and appears so when it can be shown. It is, however, difficult to describe; many words must be employed, so that the learner often becomes fatigued with the description before he can comprehend how to prune a branch. In this edition it will be seen how easy it is to prune a pyramidal apricot or peach tree, by pinching off the ends of its young shoots during the summer.

The same method of pruning, with a very slight change, may be applied to bush trees, making them stout, robust, better adapted for small orchard houses, and removing all anxiety about winter pruning. I fear it will be thought I have been very slow in bringing out these improved methods of culture: I can only offer as an excuse the gentle pace of Nature,—she will not hurry or be hurried; so that often, with very trifling gardening experiments, one or two seasons must pass before results can be known.

The article "Orchards in Cheapside," as given in "Once a Week," No. 9, has doubtless brought forth smiles of incredulity. It is, however, a fact, that our finest fruits may be grown in any garden or open space in or about London, or any other smoky city, in orchard houses, simply by "keeping out the blacks" with the woollen netting mentioned in this edition.

The day is not distant, when peaches, nectarines, and apricots, at present far beyond the reach of the merchant's clerk, will be to him familiar things; and thousands of little suburban gardens will have their cheap orchard houses, in which the tired tradesman will feel refreshed in the pleasant evenings of summer, by the mere act of pinching off the young and tender shoots of his peach trees, and inhaling the sweet perfume.

September, 1859.

CONTENTS.

PAGE

THE LEAN-TO ORCHARD HOUSE - - - 5

THE SMALL SPAN-ROOFED ORCHARD HOUSE - - 14

THE LARGE SPAN-ROOFED ORCHARD HOUSE - - 20

GENERAL CULTURE - - - - 25

- Apricots - - - - - 31
  - As Pyramids - - - - 44
- Peaches and Nectarines - - - 47
  - As Pyramids - - - - 60
- Miniature Trees - - - - 64
- Plums - - - - - 68
- Cherries - - - - - 74
- Figs - - - - - 77
- Pears - - - - - 80
- Grapes - - - - - 85
- Vineyard under Glass - - - 89
- Apples - - - - - 93
- Mulberries - - - - 94
- Strawberries - - - - 94
- Almonds - - - - - 98

THE FORCING ORCHARD HOUSE - - - 98

THE HEDGE ORCHARD HOUSE - - - 104

THE TROPICAL ORCHARD HOUSE - - - 105

INSECTS AND HOW TO DESTROY THEM - - 123

MONTHLY CALENDAR FOR THE MANAGEMENT OF THE ORCHARD HOUSE THROUGHOUT THE YEAR - - 127

CONCLUSION - - - - - 136

APPENDIX.

PAGE
I. Brick Arnott Stove - - - - 137
II. The Arnott Stove Boiler - - - 141
III. The Rationale of Orchard-House Culture - - 142
IV. The Orchard House of Thomas Bewley, Esq., at Blackrock, Dublin - - - 148
V. The Orchard House of Dr. Samuel Newington, at Ticehurst, Sussex - - - - 153
VI. Compotes - - - - - 155
VII. Select List of Fruits adapted for Orchard-House Culture - - - - - 156

Index - - - - - - 159

THE

ORCHARD HOUSE.

It was, I think, in the year 1849, that, being very fond of figs, I attempted to grow them in pots in one of my vineries; but, finding they required more room than I could spare, I sought for some method by which I could overcome the difficulty. The pots I used, I should state, were not placed on benches, but on raised borders, for I had adopted the sunken paths and raised borders for many years, to avoid the expense of the usual benches of wood. The roots made their way through the aperture at the bottom, and the plants thus, even in comparatively small pots, obtained enough of vigour to support a crop of fruit. After the crop was gathered, the pots were gently turned on one side, and the roots cut off with a knife; water was withheld, and the plants were soon at rest with well-ripened shoots. The following spring they were top-dressed with manure, and again placed on the border. But an idea occurred to me to give more room for the emission of roots by enlarging the aperture at the bottom of the pots: this I at once put in practice, with the most favourable results. I then reasoned, if figs in pots can be made to bear a crop of fruit by thus giving them extra-nourishment during the summer, why should not peaches, nectarines, apricots, vines, plums, cherries, and pears be managed in the same way? They can be so managed; and I have now much pleasure in giving the simple method by which all these choice fruits may be grown on dwarf bushes in pots, with a certainty of a crop every season: and I hope to see the day when hundreds and thousands of our small gardens will be furnished with cheap fruit-tree houses.

Glass, timber, and bricks are now comparatively cheap. Sheet-glass, which when first brought into notice cost 2*s.* per foot, can now be bought at 2*d.* per foot; so we can build cheap houses, which, without the assistance of artificial heat, will give us in average seasons the climate of the south-west of France, without the liability to injury from spring frosts, from which the plants of all temperate climates, both in Europe and America, at times suffer so severely. Let us now see how nearly glass structures without fire-heat will approximate to the climate of France in one of its most temperate districts, viz. Angers.

The Chasselas de Fontainebleau grape, our Royal Muscadine, ripens there in the open air, in average seasons, on the 25th of August: this is as nearly as possible the time when it ripens here under glass without artificial heat. The Black Hamburg grape ripens at Angers on the 25th of September: in one of my vineries, in a warm situation, I have had them fully ripe on the 15th without fire-heat. We can thus, at a little expense, in our own dear native land, reap the benefits of a warm climate and enjoy its choice fruits, without suffering from its oppressive heat.

I may here mention, that my idea of the approximation of the climate of the orchard house to that of the south-west of France is not imaginary, for some of my gardening friends from that region have said, on entering it, "Ah! Monsieur Rivers, voilà notre climat!"

An orchard house in the South of England will give, as nearly as possible, the summer climate of Toulouse, where peaches, nectarines, apricots, and grapes ripen on standards and dwarfs, in orchards and gardens, in the open air, in great perfection.

I believe that I have more than once described my "glass-roofed shed," for I have not ventured to give it too high-sounding a name: still, as it must come into extensive use, a better name may be found expressive of this peculiar structure, which is not a vinery, or pinery, or peach-house, — these all belong to great gardens, — but a place for many fruits; it may, therefore, I think, without affectation, be called an Orchard House, —a place requiring but little expense to erect, but little experience and attention to manage, and yet giving most agreeable results. To the suburban gardener, who has but a small garden, which must be a *multum in parvo*,—to the amateur with plenty of gardening taste and but a limited income,—in short, to a numerous class fully capable of enjoying horticultural pleasures, but with purses not bountifully supplied, the orchard house will, I feel assured, be a most agreeable boon. I shall, therefore, proceed to give such directions as will, I trust, enable any carpenter to build one. There are two descriptions of houses calculated for this mode of fruit culture, the lean-to and the span-roofed. I shall commence with the former, which is perhaps the cheapest and most simple of garden structures. It is, indeed, the poor man's orchard house; for with a few shillings, and skill and industry, a small house may be built by the cottager, some apricots and peaches grown and sold to his well-to-do neighbours, and his resources added to by a pleasant occupation.

THE LEAN-TO ORCHARD HOUSE.

Its length may be from ten feet to one hundred or more, according to means and space; but its breadth and height should be according to the following dimensions, unless any improved plan may be suggested which will insure greater advantages at the same cost.

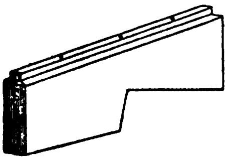
I will suppose that an orchard house 30 feet long is required. A ground plan, 30 feet long and 12 feet 6 inches wide, should be marked out. Then six posts of oak or good yellow deal, 5 inches by 3, and 9 feet 6 inches in length, or of larch poles 16 inches in girth cut in two, and the flat sides placed outwards, must be firmly fixed 2 feet in the ground: the ground ends, before fixing, should be charred 2 feet 6 inches from the bottom, and then have a coat of boiling coal tar, which adds much to their durability. They will form the black line of posts, standing 7 feet 6 inches in height from the surface of the ground. For the front wall six posts of the same thickness, 4 feet 6 inches long, must be firmly fixed 18 inches in the ground, so that they stand 3 feet out.* Two posts will be required at each end (at one end if only one door is wanted); these will form the door-posts. On these posts, both at front and back, must be nailed a plate, 4 inches by 3, on which the rafters are to rest; the posts are thus arranged in two lines.

---

* These respective heights of front and back are a matter of choice: they may be, and I now think should be, increased one foot in both walls.

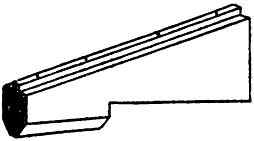
Now, then, for the rafters. These must be 14 feet long. A 9-inch-deal, i. e. a deal 9 inches wide and 3 inches thick, will make four, each 4½ inches by 1½, or nearly so. These are light, strong, and the most economical of all. Instead of "ploughing" the rebate for the glass (which is great labour and waste of material), on the upper side of each rafter, exactly in the centre, must be nailed a slip of ½-inch board, half an inch wide; this will leave half an inch of the rafter on each side for the glass to rest on — not too much for glass 20 inches in width. The rafters are so far prepared for glazing, but not yet fitted on the plates at top and bottom of the projected house: no mortices must be made, but the rafter fitted to the back plate by cutting out a piece as in fig. 1, and to the front plate as in fig. 2. They must then be strongly nailed to the

FIG. 1.



Top end of rafter.

FIG. 2.



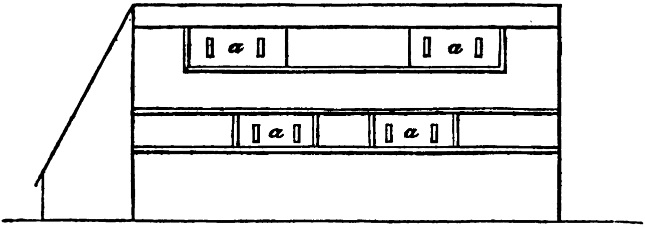
Bottom end of Rafter.

front and back plates, leaving a space between each rebate of 20 inches. A piece of ¾-inch deal board, 6 inches wide, should be nailed along the top to the end of each rafter, so as to be even with their upper edges, and in this should be a groove to receive the upper ends of the pieces of glass. At the bottom, a piece of board, 1 inch thick and 6 inches wide, must be let in, by sawing a piece out of each rafter, for the glass to rest on, and to carry off the water. We have thus formed a sloping roof 7 feet 9 inches (with the plate) high at back, and 3 feet 3 inches high in front.

The glazing is now to be thought of. This is best done by placing a broad plank, five or six feet long and two inches thick, across the rafters, for the glazier to kneel on. Two "brads" (small headless nails) should be driven into the rafter at the bottom corner of each piece of glass, so as to prevent its slipping down, which, with large pieces of glass, is very apt to occur; a bed of putty should be placed in each rebate for the glass to rest on, and the putty firmly placed over the piece of glass in the usual way when it is fixed in its place. The laps should not exceed a quarter of an inch, and they need not be puttied, as the ventilation is more free when they are not. The most economical glass is 16-ounce British sheet-glass, which can be bought at 2*d.* per foot, and the size to be preferred 20 inches by 12, placing it crosswise, as the rafters should be 20 inches asunder. I find that scarcely any breakage takes place from frost, owing to the large pieces being elastic.

On and outside the back posts ¾-inch well-seasoned deal boards should be nailed. In the back wall thus formed, sliding shutters in grooves, 3 feet by 1 foot, must be fixed to act as ventilators; two close to the roof, and two about 3 feet from the surface of the ground, as in the annexed sketch (the lower shutters in the back wall must always be on a level with the ventilating shutter in front); if two more be added to the right and left of the lower shutters, all the better: *in summer it is impossible to give too much air.*

FIG. 3.



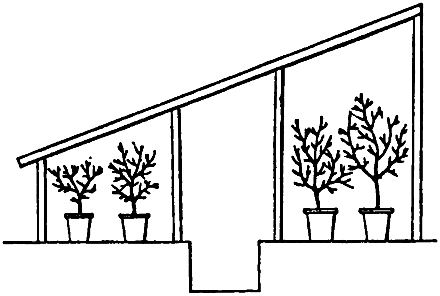
Back of Orchard House.
a, a, a, a. Sliding shutters in grooves.

The front and ends (except the doorway) must also have ¾-inch boards nailed on outside the posts; one of them, the upper one in the front, to be on hinges, so as to let down the whole length of the house: this, with the back shutters, when all are open in hot weather, will ventilate thoroughly. To add to this, and it is all required in summer, the boards will shrink and let in air: a fierce sunlight is thus admitted by the large glass, and abundance of air, in which all fruit trees thrive to admiration. The boards and rafters should be painted with stone-colour paint, which will give the house a very neat appearance.

So much for the timber and glass; but when one sees that to walk along the centre of the building, which is about 4 feet 9 inches in height, a person must be of very diminutive stature, the inquiry arises, how is head-room to be made? Simply by making a trench 2 feet 6 inches wide, and 15 or 18 inches deep, in the centre of the ground plan: this will leave a border on each side 4 feet 9 inches wide, and form a path at the same time. The front border need not be raised, as the trees in two or three years will require all the head-room they can have, but the back border should be raised about 18 inches above the surface, and supported by the brick or boarded edge to the path; for the sides of the path must be supported with boards or 4-inch brickwork. It will be found a great improvement (for which I am indebted to a friend) to divide the back border into two terraces by raising the back half twelve or fourteen inches, building a 4-inch brick wall, and filling it with earth, so that the back row of trees is elevated, and thus escapes any shade given by the front row; the effect also is very good. Now, as everything depends on these borders, for there must be no benches and no shelves, care must be taken to make their surface loose and open: loose materials, such as lime-rubbish from old walls, and road sand, mixed with manure, may be laid on them about 4 inches deep; they may then be forked over to about 9 inches in depth, well mixing the above materials with the soil: you thus have two borders not too far from the glass, and *on* which your orchard will thrive admirably. It will appear odd to read about trees thriving *on* instead of *in* a border; but when I explain that this is to be an orchard in pots, it will not seem so contrary to our usual garden culture.

It will be seen, I think, by the description I have given, that the lean-to orchard house is merely a low greenhouse with its roof sloping to the south or south-west, such as may be seen in

Fig. 4.



Section of the Lean-to Orchard House.

many of our small villa gardens; only instead of having a path in the centre and a bench on each side for the flower-pots to stand on, it has a sunken path and a border of earth on each side, *on* which fruit trees in pots are to be placed. The preceding rough section (fig. 4) will perhaps convey an idea of this structure and its use.

BUILDER'S ESTIMATE.

By Mr. Burton, Builder, Sawbridgeworth; given in 1857.

To————. An Estimate for erecting an Orchard House, 30 *feet* 6 *inches long,* 12 *feet* 6 *inches wide,* 3 *feet* 3 *inches high in front, and* 7 *feet* 9 *inches at back.*

3 feet oak door-sill, 4 by 3.
64 feet of fir for plates.
84 feet ditto for end rafters and door posts, &c., 3½ by 2½.
309 feet ditto for middle rafters and sill, 4½ by 1½.
110 feet ditto for posts, 5 by 3.
30 feet deal for top and bottom rails, 9 by 1¼.
560 feet (super.) ditto for boarding fillets, &c.
90 feet (super.) fir for sides of path, piles, latch, joints, and buttons.
Painting with anticorrosion paint, 2 coats.
187 squares 16-ounce sheet glass, putty, and labour.

£28 5 0

By using larch poles instead of squared timber for the posts, a saving may be effected; by being one's own carpenter, a larger saving. If oak be used for posts, unless small oak trees can be bought cheaply, £1 15*s.* must be added to the above estimate.

The foregoing estimate and sketch are for a lean-to orchard house standing by itself. Where there is a brick or other wall to serve as a back wall, it may be built against it, with a great saving in expense; but as sliding shutters cannot conveniently be let into such walls, ventilators may be made at the top of the slope of the roof, by having every alternate square fixed in a wooden frame, with a hinge at top and a flat piece of iron with holes in it suspended to the bottom corner; an iron peg should be placed in the rafter to fit into the holes: with this the ventilators can be raised or sunk at pleasure. In a house not more than 8 feet wide, this mode of ventilating at front and at the top of the roof will do very well; but in lean-to houses of greater width it is necessary to have shutters in the back wall on a level with those in front, so that two currents of air may meet, and "stir up" all the air in the house.

The most complete house of this kind, built against an old garden wall with a S.W. aspect, is in this neighbourhood, at Hallingbury Place. The wall is 12 feet high, and covered with full-grown peach and nectarine trees. The house is 200 feet long and 15 feet wide, 4 feet 6 inches high in front; with front sashes, 5 feet by 3, on pivots, and shutters in the back wall, so as to ventilate thoroughly. The rafters are 4½ by 1½ inches, and fixed 20 inches apart; glass 20 inches by 15, and every alternate square at the top next the wall is framed, and on hinges opening upwards (these should be arranged so as to open all at once with a line and pulley). The path in the centre is 3 feet wide, and on each side, 3 feet from the path, is a row of espalier peaches and nectarines; between the front row and the glass are bushes in pots, so that in one house are three modes of culture. It is also divided into three seasons by partitions of glass, forming three compartments; two of these are fitted with hot-water pipes, and one left without, as in a common orchard house. In one house forcing is commenced early, so as to have ripe peaches or other fruit in May; the second succeeds it with peaches in June and July; and the third, without heat, gives its crop in August, September, and October: peaches and nectarines are thus in perfection from the middle or end of May till the end of October. The fruit on the wall is the first to ripen, and is very early, owing to the warm aspect. This is one of the largest and most agreeable lean-to orchard houses I have ever seen; and, although 15 feet wide, it can be built at a less cost than the narrow upright houses in front of the walls at Trentham, which are only 5 feet in width.

The lean-to house, whether against a wall or standing alone with its boards for walls, forms a most excellent vinery for grapes not requiring fire-heat, such as the Black Hamburg and the Sweetwater and Muscadine grapes. The vines should be planted inside the front wall, and 2 feet apart, trained under the rafters, 14 inches from the glass, and managed on the spur system, which is the same as that given for the training of grapes in pots. In the South of England, the sorts above named will never fail to ripen in this kind of vinery. So much do they love free air, that I have for some years opened my ventilators in the middle of July, and have never closed them till the end of September. My grapes have invariably been of the finest quality.

THE SMALL SPAN-ROOFED ORCHARD HOUSE.

I NOW give a rough sketch and description of my favourite sort of orchard house, the span-roofed. In houses of this kind peaches and nectarines do not, perhaps, ripen so early as in lean-to houses, but quite as early as on walls. Owing to their being detached, they can be more thoroughly ventilated, and the fruit from them is generally piquant in flavour.

A situation cannot be too light and airy for these span-roofed houses. I believe that orchard houses on Epsom Downs would yield the finest peaches in the world; still they are not ineligible even for low and moist situations, where they always give a comparatively dry climate.

In situations near the sea, or in valleys with a very humid air, or in the cool moist climates of many places in the North, a single 4-inch pipe with hot water, to be kept heated all the blooming season, will be found most beneficial, as the dry air will prevent the pollen being glued to the anthers, and much facilitate the setting of the fruit. In autumn, also, it will be useful to hasten the ripening process.

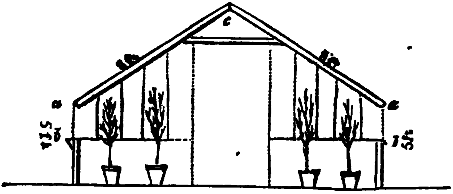
In the Highlands, and in the cool stormy climates of the North of either Scotland or Ireland, it will perhaps be quite necessary to introduce hot-water pipes into houses in which peaches, nectarines, and apricots are to be cultivated, not exactly to force them, but to insure their ripening properly. The shoots of such trees also require a dry and warm atmosphere in the autumn, even after the fruit is gathered, or they will not ripen properly; and consequently they will not put forth vigorous fruit-giving blossoms.

I have recently been informed by a gentleman who has been very successful in orchard-house culture in the Highlands, that lean-to houses with back walls of brick are to be preferred for such a climate, as they are much warmer than span-roofed houses.

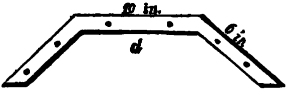
Description of my Small Span-roofed Orchard House.

Height at sides, 5 feet; height to ridge, 9 feet; width, 14 feet. The roof rests on oak posts 5 inches by 3 inches*, 5 feet apart (the usual way of building with brick foundations and sills may be employed). It stands north-east and south-west, so that the sun shines all the early part of the day on the south-east side, and in the afternoon on the north-west side.

FIG. 5.



Section of the Small Span-roofed Orchard House.



a, *a*. Glass, 18 inches. *b*, *b*. Ventilating shutters, 1 foot. *c*. Opening over door. *d*. Iron tie screwed to every fourth rafter at apex of the roof.

The rafters are 20 inches apart: it is glazed with 16-ounce glass, in pieces 20 inches by 20 inches, and has a row of glass 15 inches wide (in pieces 20 inches long placed end to end, without putty where they are joined) on each side under the eave-boards. Under the glass, also, on each side, is a ventilating shutter of $\frac{3}{4}$-inch board, 1 foot wide, on hinges opening downwards.* Below this are boards ($\frac{3}{4}$-inch) to the ground. The two ends are glazed down to the lower edges of the glass at the sides. The rafters are 3 inches by $1\frac{1}{2}$ inch, and are tied together at the apex of the roof by a light, flat, iron tie screwed to every fourth rafter. Besides these ties, and to prevent the posts going out, oaken spurs are fixed under ground to every fourth post on each side. This may seem, in print, a homely structure, for there are no sashes, and the roof is fixed; but it is really light and most cheerful-looking.

---

* Oak posts of this size, I find on referring to the wooden tombs in the churchyards, last from 50 to 60 years.

Now as to ventilation. There are no apertures in the roof, for I have long since found my houses perfectly ventilated without them. The shutters are, as it will be seen, 2 feet 9 inches from the ground. In sunny weather the air in the house, from the great quantity of sunlight admitted by the large pieces of glass, becomes soon rarefied; and then the comparatively heavy cool air from without enters in two continuous currents. This, of course, soon becomes warm and light, and ascends to the apex of the roof rapidly through the leaves and branches of the trees, which are placed on, or planted in, each border; for in this description of house the path is two or three feet wide—which may, or may not, be sunk two or three inches, according to choice,—is in the centre, and the borders for the trees on each side. It may seem strange that no egress for the heated air should be in the roof, and not quite as it ought to be; but I deal only with the result of much experience, and find that by simply leaving a triangular aperture 9 inches deep close under the apex of the roof, and over the doorways at each end, no stagnant air ever exists in my houses. When the sun shines brightly the heated air rushes out at each end rapidly enough almost to turn a small windmill; the leaves of the trees are all in motion, and no scorching takes place. This low lateral ventilation is so perfect, that in two large houses, 70 feet long and 20 feet wide, the *only* ventilators are in shutters 1 foot wide, on each side, about 2 feet 6 inches from the ground. One of these houses is heated by hot water all the summer for the culture of young Vines and Figs, yet no scorching ever occurs. I have therefore ceased to think roof-ventilation necessary in houses of a moderate width.

---

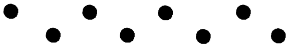
* If shutters or sashes on hinges are used as ventilators, they should always open downwards; if suspended over the apertures they prevent the downward current of air entering.

42

The great saving effected in doing away with roof-ventilation by the usual sliding sashes will be apparent, if an estimate for building an orchard house 14 feet wide be procured from any of the regular hothouse-builders. I have seen one which was at the rate of 4*l.* 10*s.* per lineal foot, making a house 100 feet long and 14 feet wide cost 450*l.*; while one built as I have described can be well finished for something considerably under 100*l.* I say this advisedly, for I have built one—with my own skill and labourers—of the above dimensions for 50*l.*

This cheapness of construction is entirely owing to the simple way in which ventilation is provided for. The borders in a small span-roofed house need not be raised, nor the path be sunk, except as a matter of choice; the expense of a brick edging is thus saved. The borders should have a dressing of manure and sand, or manure and burnt earth,—in short, of any loose materials,—and be well forked over and mixed with the dressing to 6 inches in depth.

Two rows of trees may be placed on each border thus—



3 feet from stem to stem, so that the sun may shine on every leaf. This is most essential; for I have occasionally had some of my peaches deficient in flavour, and, on examination, have always found the trees too much crowded, so as to shade each other. In these small span-roofed houses, the trees placed as above form a charming avenue, and are looked down upon by the cultivator, so that every leaf and fruit is seen.

A very light and elegant small span-roofed house may be built with sashes 2 feet in depth (from the eave-boards) hung on pivots, and beneath the sashes strong 32-ounce glass to the ground, so that roof and sides and ends are all glass. By having strong glass to the ground instead of brickwork or boards, some extra expense would be incurred, but the effect would be excellent.

The cost of a plain boarded house, as given me recently by Mr. Rivett, builder, Stratford, Essex, is as follows:—

"A span-roofed orchard house, 30 feet long, 14 feet wide; sides 5 feet, middle to ridge 9 feet, high; oak posts, 5 inches by 3; close-boarded, glazed with 16-ounce glass, painted twice with anticorrosion paint: complete, 27*l.* 10*s.*"

THE LARGE SPAN-ROOFED ORCHARD HOUSE.

THE small span-roofed house will be found an agreeable and economic structure; but large gardens require large houses, and for these the following construction may be confidently recommended.

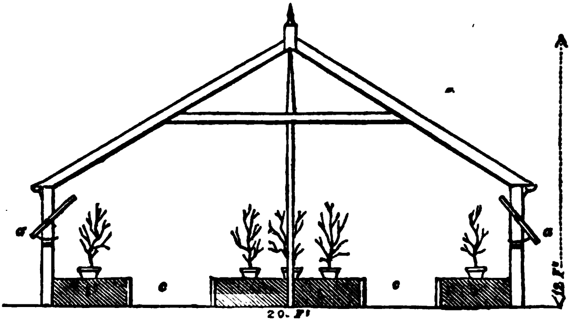
My large houses are 20 feet wide, the sides 4½ feet high, and the height to the ridge 9½ feet;

the paths are 2½ feet wide; the brick beds at the sides are 4 feet wide and 15 inches high, the central bed 7 feet wide and 18 inches high. These dimensions may of course be varied at the pleasure of the builder; I give mine exactly as they are.* The posts to support the side plates are of oak, 6 inches by 4; they are 2½ feet in the ground, and placed 4 feet apart; on these are nailed deal boards ¾-inch thick, the upper one of which on each side, 1 foot in width, is on hinges to form the shutters for ventilation; the rafters are 4½ inches by 1½, and placed 20 inches asunder. There are no ventilators in the roof, the shutters on each side, 1 foot in width, being quite sufficient. This is the most economical method of building large span-roofed orchard houses; but they may be varied, and iron, brick, and glass employed at pleasure. One recently built at Audley End (see p. 22) is, I think worthy of a short description. Its sides are brick walls, 2 feet 6 inches high; on these, sashes 2 feet 6 inches by 3 feet are fixed with pivots, so as to admit a large quantity of air: width 20 feet, length 90 feet, height 12 feet; the roof is supported by a row of 2-inch iron pillars along the centre, about 7 feet apart: the central and side beds are 20

---

* I have now (1859) come to the conclusion that the most eligible height for houses of this width is 12 feet in the centre and 5 feet at the sides, which should be of glass for a space of 18 inches or 2 feet under the eaves.

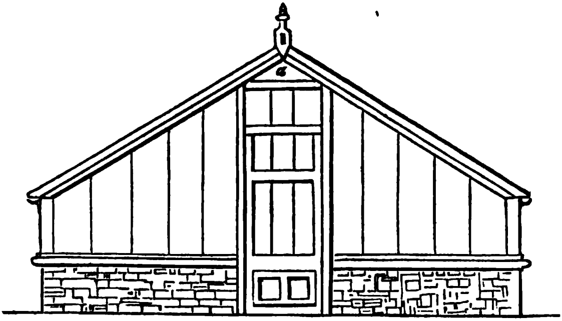
Fig. 6.



Transverse Section: 20 feet.

a, a. Sashes on pivots.—b, b, b. Beds (supported by 4-inch brick walls, built with cement) filled up with compost.—c, c. Paths

Fig. 7.



End Elevation.

a. Aperture over door at each end.

Large Span-roofed House at Audley End.

inches high, the path 3 feet wide. This is really a noble orchard house, and forms a healthy and most agreeable promenade.

I have very recently (June 1860) built a house here, which for strength and lightness of construction is one of the most eligible and agreeable I have seen. It is 100 feet long, 24 feet wide, 12 feet high in the centre, and 5 feet 3 inches at the sides. Under the eaves on each side is glass (fixed) 18 inches wide, and glass at each end. Under the glass on each side is a ventilating shutter 18 inches wide, on hinges opening downwards, and below that boards to the ground. At each end, just under the apex of the roof, as in fig. 7, *a*, are openings 3 feet in depth, to which sashes are fixed; these are to be open all the summer, to let off the hot air, and this is all the top ventilation necessary.

The roof, which is formed with light rafters 3½ inches by 1½, is supported on each side by seven light wrought-iron pillars, 1½ inch in diameter, fixed to a bar of iron which is let into the rafters. Each row of pillars is 6 feet from the sides of the house, so that there is a border on each side 6 feet wide, and an area in the centre 12 feet wide. This space is formed into a central border and two paths. No raised beds are made; the whole interior of the house is a flat surface. In the central and side borders pyramidal trees will be planted, and among them a large number placed on the surface in pots. A house of this size would grow enough choice fruit for a very large family.* In all houses where expense is not heeded, the water should be conducted from the roof into a tank or tanks under ground, either outside or inside. Rain water is the best of all to syringe or to water the trees with.

The following is the estimate recently given me by Mr. Rivett for a large span-roofed orchard house, built with boards for its sides and ends.

"An orchard house, 30 feet long, 20 feet wide; sides 5 feet high; middle 12 feet to ridge; with iron pillars to support roof, oak posts, close-boarded, roof glazed with 16-ounce glass, painted twice with anticorrosion paint, 45*l.*"

The raised brick borders generally built in houses of this size are not included in the estimate. I may add, that raised borders may be dispensed with if pyramidal trees are cultivated The tallest trees should occupy the centre. This kind of house, furnished with nicely pinched in trees with straight stems, would have a very "gardenesque" effect, and would be very productive.

---

* In No. 56 of "All the Year Round," for 1860, it is suggested that a few trips to Sawbridgeworth should be made by small market-gardeners and cottagers, "as it is not enough to *tell* them what *may be* done with orchard houses, they must be shown what *is* done." I can only say, that poor and rich, or those neither one nor the other, in short, all who wish to benefit by what they can see and hear, if they will make their way to the Harlow Station, on the Eastern Counties Railway, and then to Rose Hill, between Harlow and Sawbridgeworth, may see houses of all kinds, approaching to forty in number, and have all their questions answered.

It is essential that these large houses should stand endwise N.E. and S.W., or nearly so; for if placed N.W. and S.E. as mine are, owing to the peculiarity of the site, the trees in the north-east border will be too much shaded, and will not ripen their fruit well. I also prefer the same position for small span-roofed houses. The height of the above exceeds that which I have given in p. 20, but I am inclined to think it more eligible, for it is surprising to see what fine and even large trees can be grown in pots.

GENERAL CULTURE.

A VERY good gardener has asserted that peaches and nectarines from bushes are inferior in flavour to those grown on trellises in peach houses; and that he could produce more fruit in the same space by the latter mode. I can easily imagine a partial failure in flavour; not owing, however, to the system, but to the management. The trees alluded to have not had room or air enough, and consequently the fruit has not been high-flavoured. I have had Noblesse and other peaches of the most delicious flavour from bushes in a pot standing in the full sunshine in one of my houses, while those from trees partially shaded were not good. The peach-house trellis system is not adapted for small gardens; one tree, or at most two, will cover the roof of a house 20 feet by 12; and nothing can be grown under them. Besides this, three or four years must elapse before they commence to bear to any extent; and, above all, it will require a good gardener to train and prune them, for no amateur could bear the fatigue of constantly keeping his eyes to the sun.

Since the foregoing pages were written, "crystal palaces" have been built. I have written for more humble gardens; but large orchard houses may be built on the ridge and furrow system: still it will require caution, for such houses must be thoroughly ventilated to give piquant flavour to fruit. One of these "palaces," with raised borders, well furnished with peaches, nectarines, apricots, figs, and even pomegranates, in 20-inch pots, and treated as recommended for all other orchard-house trees, would realise an Eastern garden, and bring to mind one of the fruit-gardens of Damascus so vividly described by travellers. In short, I know of nothing in gardening more capable of fully gratifying the senses of sight and taste. Thus in large places, in lieu of a cheap and simple orchard house, a fruit conservatory heated by hot-water pipes may be built, and the trees grown in ornamental vases placed on elevated beds. A few tea-scented and other delicate roses, and spring-flowering bulbs, planted in the borders, would make them gay, and have a pretty effect. It must, however, be recollected, that but very few of what are called conservatory plants can be planted in a common orchard house; for it is necessary that it should be cold and dry in winter to give the fruit trees their rest. If fire-heat be used, it must only be applied early in spring—towards the end of February—to force the fruit, if early fruit be required; and not in winter, as in greenhouses, to keep out the frost. I have reason to believe that orange trees and camellias may be planted in the borders with a good chance of success. They should have no water after the middle of October; about the middle of December some sticks should be stuck in the ground round each tree, and the space between the sticks and the tree filled up with dry hay; a mat, or light woollen cloth of the kind called "Frigi Domo," would answer well wrapped round the sticks. The mat or outer cover should be taken off by the end of January, leaving the hay, and be replaced if severe frost comes on. It would insure success with oranges and camellias planted in the borders, if the house could be gently heated in severe weather, so as to prevent the temperature falling below 26°; this would not stimulate the fruit trees to any extent, and yet would, to a certainty, preserve camellia and orange trees. The most severe frost will not injure tea-scented roses or bulbs, if the house be kept perfectly dry after October.

It is very possible that some may say, "Why not plant the trees in the raised beds, rather than in pots or vases?" They may be so planted, as I have elsewhere stated, but there is much to be said in favour of pot culture. In pots, the size and growth of the tree may be regulated with the greatest nicety; the annual root-pruning can be done with much facility, and there is no occasion to dig and disturb the borders. Indeed, as far as my experience has gone, I can honestly recommend pots, vases, or boxes, for fruit trees in orchard houses or fruit conservatories. In the "Gardener's Magazine," vol. ii. page 278, peach trees are mentioned as having been in pots twenty years without being repotted: they had been kept in health and fruitfulness by top-dressing only.

Peach and nectarine trees planted as pyramids, in orchard houses, will, however, give great satisfaction to the "poor gentleman" who is his own gardener, and who will fully enter into any new mode of gardening. Peaches and nectarines thus cultivated should be lifted and replanted, with a little rich compost, annually, the last week in October: they should each have, when replanted, four or five gallons of water, and the same quantity about a week after. In pages 60—64 I have gone more fully into this new method of culture.

*Size of Pots.**

In potting trees for this description of culture, pots of different sizes may be used, according to the taste of the cultivator. If large trees for large houses are required, 18-inch pots (18 inches in diameter and 18 inches deep) will be necessary; for moderate-sized trees, 13-inch pots: this on the whole is a very eligible size. For smaller compact bushes 11-inch pots are convenient, as they are not unwieldy, and the trees may be made ornaments of the sideboard in the dining-room; and beautiful objects they are when full of fruit. Miniature, yet fruitful, peach and nectarine trees may be grown in very small pots, for I have some not more than 9 inches high, in 8-inch pots, full of blossom buds.

In remote places where large pots are difficult to be procured, tubs like those used for orange trees, or more properly boxes, may be employed with success, and for trees of large size, i. e. when they are from ten to fifteen years old, they will probably be absolutely necessary. They are easily made: boards an inch thick, either of oak or deal, should be firmly nailed together so as to form a box 15 inches deep and 20 to 24 inches square; the bottom should be formed with bars an inch thick, placed about half an inch asunder, to allow the roots to penetrate into the borders.

---

* It may save trouble if I here give the names of persons who supply articles used in orchard-house building, &c.:—

Pots.—Messrs. Scales, Green Lanes, Stoke Newington, London.

Glass.—Messrs. Phillips & Co., 180, Bishopsgate without, London.

Anticorrosion paint. This should be mixed with boiled linseed oil.—Messrs. Carson & Son, 9, Great Winchester Street, London, E. C.

Compost.

The best compost for all kinds of fruit trees in pots is the top spit of a pasture with a tenacious loamy soil, or the same kind of loam from a ploughed field: this should be dug and exposed to the air for two or three months in the summer, and is then fit for use.

Two thirds of this loam, with one third of rotten manure, should be chopped up (not sifted) and well mixed. If it contains a large portion of lumps as big as an egg, so much the better. If only a light sandy loam can be procured, as is the case in some districts, the same proportions may be used; but the ramming down of the compost must be firmer; in fact it should be regularly pounded with a heavy pestle. I have reason to believe that more failures have taken place in the pot culture of fruit trees from the soil being too loose than from any other cause.

APRICOTS.

Apricots in pots are very rarely seen, even in large establishments; they are difficult to force, as they will not bear the confined air of a forcing-house. I remember, some years since, being much struck with some apricots cultivated as dwarf trees in the South of France: the trees, full of their golden fruit, looked so beautiful, that I wished that our climate would allow us to grow them in the same way. I had not then thought of cheap glass, root-pruning, and pot culture.

It must always be borne in mind, that, without abundance of air and the full light of an unshaded roof*, fruit of high flavour cannot be grown; the trees will bear well, but their fruit will be vapid and flavourless.

The best trees for pot culture are such as have been in pots one or two years: if these can be purchased, so much the better. The next best are trees that have been removed and cut down one year in the nursery. If neither of the above can be found, "dwarf maiden trees"† will do. Trees taken from the open ground must not be potted till the end of October. Presuming that potted trees have been procured, they may, early in October, (or, if omitted then, in November or December,) be repotted into pots of the size selected for this system. I have named 11-inch pots, because they are portable, and the trees may then be shifted into large pots as they advance in growth; 11-inch pots will, at any rate, do well to commence with. October, November, and December are the best months for potting trees; they may indeed be potted till March, but then no fruit must be expected the first season. If fruit-bearing trees grown in pots have been procured, they cannot be potted too early in October.

---

* In sunny climates in the South of England, if it be thought desirable to train a few vines under the roof of an orchard house, they should be at least 12 feet apart, and pruned closely on the spur system, so as to give as little shade as possible.

† This is a term applied by nurserymen to trees one year old from the bud or graft.

If you examine an 11-inch pot, you will find it 8 inches across at the bottom, and the aperture from 1 inch to 1½ inch in diameter. Take a light hammer, and enlarge this aperture to 5 inches in diameter*; then place four or five large pieces of broken pots or tiles across, so that they rest on the inside ledge left by the hammer, leaving interstices for the free emission of roots. On these place some of the most lumpy part of your compost; then your tree, not too deep, but so that the upper parts of its roots are a little below the rim of the pot: if it has a ball of earth, loosen it. Fill up with compost; ram the earth down firmly, as you fill, with a stout blunt-pointed stick. Place it on the border where it is to grow during the summer; give it two or three gallons of water, with a top-dressing of some manure to lie loosely on the surface, and the operation is finished.

---

* I now have my pots made with five holes, each an inch and a half in diameter. In remote places, where these cannot be procured, the enlarged holes may be used.

If the soil over which the house is built be dry and sandy, the pots (this applies to all kinds of fruit trees) may be plunged two thirds of their depth: this saves much watering. They must, however, be lifted as directed in Calendar, pp. 131, 132.

Pots placed on the surface will require in hot weather from two to three quarts of water each, once a day. In cool cloudy weather this quantity may be given about twice a week. Fruit trees of all kinds may be potted in autumn; and if the orchard house is not ready for them, they may be kept in any shed till the beginning of February, covering the pots thickly with litter, to keep the roots from being injured by severe frosts.

We will suppose that our tree, a nice dwarf bush, with five, six, or seven branches*, is potted. It may rest till February, and then be pruned: a pleasant simple operation, the performance of which is more easily shown than described. I may as well now state that the pruning recommended here for apricots will serve for all bush fruit trees under orchard-house culture, except peaches, nectarines, and figs. Each branch must be shortened with a sharp knife to ten inches: these shortened branches will form the foundation of a nice regularly shaped bush. In May each branch will put forth three or four shoots: all of these but the topmost one must be pinched off to within about two inches of their bases: they will form fruit-bearing spurs: these will continue all through the summer to make fresh shoots, which must always be pinched off to a length of two inches. The leading shoots, which will make vigorous growth, should have their tops pinched off when they have made six inches; and when young shoots break forth from these pinched shoots, they should again and again be pinched to six inches in length. The summer is past; the month of October is with us. Its shoots are ripe, and the tree has ceased to grow: it must be put to rest for the winter, by lifting up the pot and cutting off closely every root that has made its way into the border: it is then ready for its top-dressing, the method of giving which I shall describe further on.

---

* If a tree with only three or four branches is potted, they must be cut in to four inches; and the tree must have a season's growth to form itself.

The second season:—In February, or early in March, the leading shoot made the preceding year, and which ought to be from two to three feet long, must be shortened to ten inches, and the young shoots, as they push forth in summer, be pinched off as in the first season. The third season:—As the tree will have increased in size, its leading shoots may be shortened to six inches; and as it becomes aged and fruitful, annually to four inches, and at last pinched off in summer to two inches, so as to make a compact round bush. In the course of time some of the shoots in the centre of the tree will require thinning out with the knife, if at all crowded.

A more simple mode of pruning, even than that above given, is to purchase a bush-apricot of two or three years' growth, and during the spring and summer to pinch *every shoot* to five leaves as soon as it has made six or seven, exactly as recommended for pyramids, p. 44. Trees thus treated increase slowly in size, but they form compact and most fruitful bushes. I fully believe that this simple mode of pruning, which even a lady may find pleasure in carrying out, will do away with one great difficulty in orchard-house culture, that of a spring pruning, always so difficult to teach. I recommend the shoots being pinched back to five leaves (not counting the two or three small leaves at the base of the shoot), instead of three as in bush peaches, because the buds of apricots are so close together.

The general management of the trees the second year should be as follows:—

February is with us, and, if the season be mild, buds are beginning to swell, and flowers to bloom; the trees in your orchard house are, however, dry, dusty, and stagnant. Place them in their stations, 3 feet stem from stem; give each of them a small quantity, say a pint, of water,—not, however, if the winter is still raging; let them rest three days, then give them a quart each; in short, gradually saturate the earth in the pots, and, when the trees are in full bloom, make holes in the centre of the earth in the pots with a pointed iron rod, and give each tree two gallons; afterwards water them regularly according to the state of the weather. The buds, if the weather be mild, will soon begin to swell, and in March, or early in April, if the season be late, they will put forth their full bloom; and beautiful things they are, for no frost, no storms, will destroy the blossoms. If the weather be sunny, with sharp frosts at night, as is often the case in early spring, the shutters, both back and front, may be opened all day and closed at night; if a wind-frost and cloudy weather, they may be closed day and night; the ventilation through the joints of the boards will then be amply sufficient. With this treatment nearly every blossom will set. As soon as the fruit becomes the size of a horse-bean, commence syringing the trees morning and evening with soft water, and continue to do this till it is as large as an acorn, which size it will arrive at in ten or twelve days. Afterwards syringe only once a week in the morning, or, if the weather be cool and cloudy, not at all. From recent experience, I find that apricot trees are not liable to the red spider, and the fruit seems to

like a dry warm climate. Too much syringing brings on black spots on the surface of the fruit and decay. Weak liquid manure may be given once a week during the summer. This is, however, almost a matter of choice. My trees grow and bear well without it. Guano water, one pound to twenty gallons, is perhaps as good as any; and a good soaking of this once a week is better than using it more frequently. While in their young state, the fruit must be thinned, leaving, at first, upon a bush that has been two years in a pot, about three dozen; which, when they attain the size of a small nutmeg, must be reduced to two dozen. The third year, a tree, if it has prospered, will be able to bring three dozen to maturity; it is, however, better to have a few finely grown fruit than many that are small. If some of the trees are required to decorate the dessert (and what can be more ornamental than an apricot tree full of fruit?), they may be made ready for removal by lifting the pots, to keep the roots from running too deeply into the border. This is best done about four times in the course of the summer — say June 10th and 25th, July 10th and 25th. The young roots are thus broken off and arrested in their progress downwards, and they then form numerous spongioles, which keep on the surface of the border and obtain wholesome food. Trees that have been used to ornament the dessert should be replaced in the orchard house after the fruit is gathered, and have water till the end of October.

To sustain trees in health in pots, something more must be done than allowing their roots to go into the border. Annually, in October, every tree should have a top-dressing of rich compost. I have employed, with much success, horse droppings gathered from the roads, and unctuous loam, equal parts.* The former I have had saturated with night-soil or liquid manure, and then exposed to the air for two or three months before mixing it with the loam. Some powdered charcoal strewed over this compost will prevent any disagreeable smell. Any kind of rotten manure and loam seems, however, to answer well for top-dressing, which is done in the following manner:—Take out a portion of the soil 6 inches in depth, and about 4 inches in width all round the side of the pot, leaving the central mass of roots undisturbed (a portion of the mould may, however, be picked out from among the mass of fibres with advantage, as fresh food can do them no harm); then fill in the compost, and ram it firmly down; keep on filling and ramming till it is on a level with the edge of the pot; place two or three inches of the compost loosely on the surface, as it will settle much during the winter; give one or two good soakings of water; and then place the trees close together, for you will thus have more space for winter parsley, lettuces, young cauliflowers, and other matters requiring shelter. Water must be withheld, and the trees suffered to remain dry and completely at rest during the winter.

---

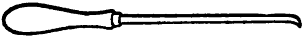
* There is a new manure called "Bromley Stercus," the refuse of some woollen manufacture, which is free from any offensive smell, and seems admirably adapted for surface dressing, as it effectually keeps in moisture and acts as a manure. It should be placed on the surface, about 2 inches in depth.

In spring, as soon as the fruit is set, and about the size of horse-beans, place on the surface of each pot some rotten manure, about two inches in depth; this feeds the roots, and keeps the surface moist.

This treatment may be continued every year without variation. In removing the trees to their allotted places on the borders in spring, I have lately found it beneficial to take out about two shovelfuls of earth from the place where the pot is to stand, and substitute the same quantity of the compost used for top-dressing: the tree is thus fed from above and below. It will be necessary in very dry winters to watch the trees to see if their shoots shrivel; if so, they must have a small quantity of water, but not in severe frost; and if the winter be excessively severe, to "make assurance doubly sure," some dry hay or litter may be laid on and around the pots, so as to make the roots perfectly safe from the effects of severe frost.

The best implement for top-dressing is a piece of iron rod an inch and a half in circumference and nine inches long, flattened at the end, with a handle of wood five inches long, like the annexed figure.

FIG. 8.



Now, let us see what we may expect from this treatment. The apricot, the peach, and nectarine, as is well known, all come from the East. We will take Persia or Armenia. The winter there is dry and very severe; the spring dry, with hot sun and piercing wind, just when peaches and apricots are in full bloom, and yet how they succeed! Let any one go into an orchard house when we have our usual March weather: the wind will whistle through it, and the climate will be dry, sunny, and bracing; the blossoms, under these circumstances, will all set. Unfortunately, we cannot command sunshine enough to carry us along, to make our fruit ripen in May and June, as in warmer climates; we must, therefore, wait patiently, for our orchard-house climate is slow but sure in its operations. If the above directions are followed, Eastern nature is imitated as closely as our cloudy skies permit. The trees bloom in a dry airy place; they pass through a comparatively dry warm summer; they are, like all trees natives of dry climates, early in a state of perfect rest, which is continued all through the winter, and thus they form healthy shoots and well-developed blossom-buds. Nothing in culture can be more perfect, and all is so simple, that, knowing as I do with what facility it is performed, I regret being obliged to use so many words in describing it.

It will be seen that I have, to carry out this system, recommended houses of wood and glass; those, however, who prefer brick to wooden walls, may have them; as any greenhouse can be made into an orchard house, by merely lowering the roof to the height given in page 7*, sinking the pathway, and having sliding shutters back and front. The grand essentials are, a roof not too lofty, borders instead of benches, and constant lateral ventilation, more or less according to the state of the weather, through the shutters; but in houses with brick walls there will not be that constant gentle percolation of air which there is through boarded houses, and which seems so highly favourable to the well-being of stone-fruits.

I find I have omitted to state the number of trees that may be grown in a given space. The trees should be placed in the borders, back and front, 3 feet apart, stem from stem. A house 30 feet by 14 will thus hold thirty trees. Thirty trees will give sixty dozen and upwards of fruit when in full bearing. A small bush of the Pitmaston orange-nectarine, four years old, produced one season four dozen of fruit, and brought them all to perfection; still this is too many, as some of the fruit were small. I mention this merely to show what can and may be done by this very interesting mode of cultivation, which, to sum up, is as follows: annual top-dressing, annual summer pruning by pinching, autumnal or spring pruning, and root-pruning.

---

* It must always be borne in mind, that a roof should not much exceed 12 feet to the ridge; the nearer the glass, the finer the fruit.

There are, I well know, some amateur as well as professional gardeners who object to the pot culture of apricots; to such I can with confidence recommend the planting of apricot trees in the borders, and lifting and replanting them biennially, about the end of October, with a few shovelfuls of the potting compost: they soon form compact and most fruitful bushes. I have some trees under this treatment remarkable for their healthy and sturdy growth.

The season of that very fine sort, the Peach-Apricot, may be prolonged to a great extent; it generally ripens in the orchard house about the first week in August, but by the following simple method it may be had in perfection till the middle of October. At the end of June some trees full of fruit should be selected, and those for a very late crop should be placed under a north wall till the first week in September, and then removed to the orchard house to ripen their fruit in October.

Those that are to ripen in September should be placed in a sunny exposed situation till the end of August, and then be removed to the orchard house. The fruit from trees that are much retarded will not always prove good, unless the weather be fine and warm; but that from trees set out of doors in a sunny place, and then ripened in the house, will be most excellent.

Half-standard apricots may be made charming ornamental trees for the summer decoration of the flower-garden. For this purpose trees with nice straight stems, about three feet in height, should be selected, and planted in pots or tubs. They should be grown in the orchard house, and about the middle of July be removed to the lawn, or any part of the garden where such trees would be desirable. They can be pruned into round heads and employed for summer ornaments, just as orange trees are in many gardens: they will be found equally ornamental and more useful, because their fruit is valuable.

The most desirable sorts of apricots for pot culture are: the Large Early, which ripens in July; St. Ambroise, which follows very closely; the Kaisha; the Blenheim; the Royal; and the Peach-Apricot, like the Moor Park, but larger and a better bearer. These are placed as nearly as possible in the order of their ripening, and give a good succession.

They will come in early at the same season as those on walls; for it must be understood that fruits in thoroughly ventilated orchard houses are not much forwarded, unless the season happens to be very sunny. It is not an *early* but a *certain* crop that must be expected. I have not named any later kind than the Peach-Apricot, because it is so easily retarded and is always of the highest excellence; it is also the most abundant bearer of all.

APRICOTS AS PYRAMIDS.

This most charming mode of growing apricots in pots will in a short time be the *only* method followed.

The management and pruning of pyramidal apricots are "pruning made easy," so that any lady may attend to her trees without fear of committing herself by taking off a wrong shoot.

Pyramids in pots may now be bought in the nurseries. They should be potted in October or November in 13-inch pots, and if they have been properly managed they will bear a fine crop of fruit the first season after potting. The fruit should be thinned exactly as recommended for bush trees, and as soon as the trees put forth their young shoots in May pinching must be commenced. What a pleasing pastime it is! Every shoot, as soon as it has made six or seven leaves, must have its sixth leaf with the end of the shoot pinched or cut off with a penknife, leaving five leaves, exclusive of three or four small leaves generally found at the base of every apricot shoot. The leading shoot only must be pinched so as to leave nine leaves. Two or three shoots will break out from this leading shoot; all but one of these should be pinched down to five leaves, and when this has made ten leaves pinch down to nine; this will require to be done two or three times during the summer, the tree gradually increasing in height. All the pinched shoots growing from the stem of the tree, after the first pinching, will put forth numerous young shoots; all these must be pinched off to five leaves, as soon as they have made six or seven. This must be constantly attended to till the trees cease growing. Many of my trees have up to this time (Sept. 10th) been pinched from four to five times, and every branch from bottom to top of the stems is a cluster of blossom buds.

The tree must be formed into a cylinder or cone by pinching (the term pyramid is incorrect, yet no other offers itself); and I need not say how beautiful such trees are when studded with their golden fruit. I firmly believe that no object ever placed under the hands of a gardener will deserve or claim such admiration as a conical apricot tree, seven to eight feet high, full of fruit.

This description of tree may be planted out in the orchard house, and a large number of trees cultivated in a small space; but in small or moderate-sized houses they should be lifted and replanted annually in October.

By growing the Peach-Apricot in this manner in cheap houses, our markets can be supplied with apricots at a price not at present thought of.

Our market-gardeners, at present wedded to their wall culture of fruit trees, will do well to cover a few acres of ground with cheap orchard houses, and to plant out in them pyramidal apricot trees. These may be suffered to make trees 7 to 8 or 9 feet in height. If pinched in incessantly their growth will be much arrested, they will not require annual or biennial lifting, and they will bear abundantly. Covent Garden will then be supplied with such apricots as have rarely been seen there. They may be sold cheap, and yet yield a fortune to the growers. The Peach-Apricot is the only kind adapted for this profitable mode of culture.

If pyramidal apricot trees cannot be bought, maiden trees may be potted in October, their side shoots pruned in to within two inches of the stem, and the following summer they will, with constant pinching, make very nice pyramids.

The trees, when planted out, will require in spring a good dressing of manure on the surface round their stems, and of course water during the summer, although not nearly to the extent required by potted trees.

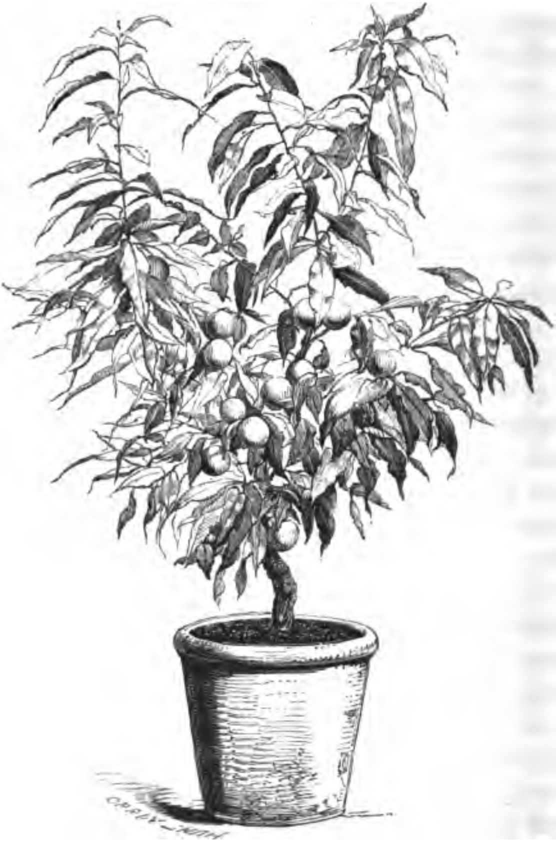
Pyramids in pots may stand 20 inches asunder stem from stem. Pyramids planted out in the borders of the orchard house may be planted 2 feet apart. After a few years,—for they increase in bulk slowly,—the distance may be extended to 3 feet apart; as the trees are lifted annually or biennially, these changes are easily made. It must always be borne in mind that a tree lifted and replanted annually receives a slight and healthy check only. With biennial or triennial lifting the check to growth is more severe.

PEACHES AND NECTARINES.

Few fruit trees give more satisfaction in the orchard house than a choice selection of peaches and nectarines: when in blossom, in early spring, the trees are so fresh and beautiful; they are so exceedingly prolific; and in autumn, what fruit can vie in beauty with a ripe peach or nectarine? and what, to the lover of fruit trees, can be more gratifying than to see his sideboard or dining-table decorated with peach-bushes in pots, studded with their lovely and perfectly ripened fruit?

If bushes of only a moderate size be required, 11-inch pots, as recommended for apricots, may be used. It is surprising to see the vigorous growth and fine fruit of peach-trees in 11-inch pots; for, owing to the compost being rammed down, a large quantity of nutriment is comprised in a small

FIG. 9.



An Elruge Nectarine Tree, three years old.

From a daguerreotype.

space. I may as well, however, state, once for all; and for all descriptions of fruits, that, if fewer and larger trees be required, larger pots may be employed; thus, 13-, 15-, or 18-inch pots may be used with equal success, by having numerous apertures at the bottom, allowing the emission of roots during summer, root-pruning, and putting the tree to rest during winter. A peach or nectarine tree may thus, in two or three years, be made capable of bearing many dozens of fruit: but I must confess that my taste inclines to small prolific trees only, because one can have greater variety in a small space; and small trees are pretty, and easily looked over, so that each leaf and bud, each blossom and fruit, is known.

If peach trees already in pots, and in a bearing state, can be purchased, so much the better, for then a year is saved; but as such are more expensive than either "maiden" or "cut-down" trees, the cost of which is generally about 1*s.* 6*d.* to 2*s.* 6*d.* each, these had better be purchased. I may here state that "cut-down" trees are two years old, and if nice healthy trees with fully ripened shoots can be found, they are better than "maiden" trees. But as they are not often to be met with, I will first give the treatment required by one-year-old, or "maiden," trees.

These have one shoot, more or less vigorous, which should be well furnished with buds towards its base. This shoot must be cut clean off with a sharp knife, at the seventh bud from its base, and the tree then potted in the same compost recommended for apricots, in the same-sized pots, and at the same season, being towards the end of October, or early in November.* The following summer every bud will, or ought to, produce a shoot. If there are seven shoots, the tree is formed for the season: they need not have their tops pinched off, but will merely require the laterals (small side shoots) pinched off to within two buds of their bases, as soon as they are four inches long. This will induce the ripening of the shoots, so that by the end of the summer they will be full of blossom buds. At the end of August the point of each shoot should be pinched off, and they will then only require the annual pruning, either in autumn or in spring, for which directions are given below. If the tree puts forth a fewer number of shoots than seven, the tops of all should be pinched off early in June; each shoot will then put forth three or more young shoots; all that are not required to form the tree must be pinched off in the same way as laterals, leaving seven, or if the tree be vigorous nine, shoots to each tree. These trifling manipulations are easy to do, but difficult to describe: so, to make the matter as clear as possible, let us place a young tree before us early in June, with five branches, each twelve inches in length; then let us, with a sharp penknife, shorten each branch to nine inches; then, at the end of June, let us take the same tree in hand, and we shall find that each shortened branch has put forth two or three young shoots; we must pinch these so as to leave on four branches two, and on one only one, making nine shoots, which as they grow should have their laterals pinched off regularly; they will then make vigorous trees in one summer, and form an abundance of blossom buds. No other pruning is necessary the first season; and if abundant ventilation and syringing daily, as recommended for apricots, have been attended to, the fruit buds will, towards the end of August, begin to be fully developed. The experienced gardener can at once distinguish them: such a person may prune his trees early in October. Let me endeavour to tell how to distinguish a fruit bud, which, by the way, is the only bud to prune down to.

---

* This season is recommended, but it may be departed from; for my peaches and nectarines are sometimes not potted till March, yet they make fine growth.

Well, then, generally,—or "general always," as a foreign friend expresses it, when he wishes to say anything that invariably takes place,—towards the base of each of your seven or nine shoots, you will find four or five pointed single buds, covered with their brown coat: these are leaf buds. Next to these, and higher up the shoots, are triple buds; a plump silver-coated one on each side, and a thin one in the centre: these plump silvery buds are blossom buds, and the central one a leaf bud, which produces a shoot, so necessary to the well-being of the blossom buds, that without it they would be abortive. Be sure to have on each shoot, if possible, nine to twelve of these triple buds, and cut off the shoot close to one of them; if this cannot be found at the proper place, so as to be able to form the foundation of a nice, regularly shaped, bush-like tree, cut off the shoot at a leaf bud. If the trees be pruned in autumn, the buds are difficult to distinguish; it will, therefore, be better for the beginner not to prune his peach and nectarine trees till February or early in March, when every bud will plainly show its character, the blossom buds by that time will have opened their silvery coat, and the bright pink will be peeping out. If the shoot be cut off at a single blossom bud, it will die down to the next leaf bud; this must, therefore, be carefully avoided.

Let us now proceed with the culture of our maiden tree. A season has passed; it is early spring, say the middle of February, and our tree, with its nine branches of the last summer's growth, is before us: three of these should be cut down to within five buds of their bases, to give a supply of young shoots for the succeeding year, and six should be cut down so as to leave on each branch ten or twelve triple buds. These are the fruit-bearing branches for the present season: and so it must be every year; a few branches, say one third, must be cut in closely on opposite sides of the tree to give young shoots, and the remainder left as above to bear fruit. Those shoots that have borne fruit will often require to be cut out, to make the tree dwarf and prevent its becoming naked, as the spurs die after bearing, unlike those of the apricot and plum, which continue to bear fruit for many years. Much will depend upon the sort cultivated, and the vigour of the tree. One thing must be borne in mind, — do not let the tree become bare of young shoots towards its base, and tall and straggling. If pruned in spring, the nature of every bud may be seen, and the tree formed, by the proper use of the knife, into a fruitful beautiful bush.* From twelve to fifteen leading shoots should be left, in summer pruning, on each tree when in a full bearing state.

I have thus endeavoured to follow the "maiden" tree to its fruiting state. The "cut-down" tree, which should have four or five branches, should be potted in autumn and pruned in early spring: each branch must be shortened to six inches; these will put forth numerous young shoots, which in June should be thinned out with a sharp knife, leaving nine or more shoots to be pruned the following spring, as above directed. If trees in pots three or four years old in bearing state can be purchased, it is a saving of time, for, if they be potted before Christmas, a crop of fruit may be expected the ensuing summer. In such trees, the shoots intended to bear fruit, and covered with triple blossom buds, may be shortened to ten buds, and those which are to make young shoots for the next year's bearing should be shortened to five buds.

---

* When the trees are in a bearing state, many short spur-like shoots, from four to six inches long, will be made every season on the stem and towards the base of the principal branches. These will be generally covered with single blossom buds and a terminal leaf bud: they may be removed if too much crowded, *but never shortened.*

SUMMER PINCHING.

Pruning of bush trees by summer pinching only has been practised here for two seasons to a large extent. As this is the most simple of all the methods of pruning known, and may be practised by any lover of gardening who does not mind employing his finger and thumb when walking in his orchard house, it is worthy of a few lines of description.

A peach or nectarine tree of the usual bush-like form, two, three, or four years old, may be potted in the autumn. In March its shoots should be shortened to about half their length, forming the tree into a round bush. In May it will put forth young shoots. As soon as they have made four or five leaves, the fourth leaf, with the end of the shoot, must be pinched off, leaving three leaves, exclusive of one or two small leaves at the base of the shoot, which are without buds: every shoot must be thus operated on. In eight or ten days a fresh crop of shoots will show itself, for from the bud at the base of every leaf a shoot will spring forth. These, as soon as they are ready, must all be pinched down to three leaves, and so on all through the summer with every fresh crop of young shoots, till the end of July: for, if the pinching be continued till the end of August, a great number of the shoots will be a mass of blossom buds without a terminal shoot or leaf bud; and although they may be cut out, and yet leave more blossoms than the tree can carry on to a fruiting state, it is as well to have most of the spurs with a terminal shoot or leaf bud. If bush trees are in very large pots, or planted in the borders of a large house, and it is desired to have them increase more rapidly in size than pinching to three leaves will lead to, the pinching should be at the sixth or eighth leaf, leaving five or seven in every operation instead of three. This is applicable to all kinds of fruit trees under summer pinching, when large trees are wished for. My trees, under this incessant pinching, are sturdy bushes, full of blossom buds, and quite pictures of robust health. By this system, the size and beauty of the fruit are increased, owing to its full exposure to the sun. In March it will be good practice to thin out some of the numerous blooming spurs with a sharp penknife, otherwise the trees will be too much crowded with blossoms.

This simple and charming method of pruning, only occurring to me in 1858, was fully carried out in the summer of 1859. I am quite at a loss to account for its not having been discovered earlier. As far as regards myself, I think it was the fear of inducing, by incessant pinching, too many young shoots to break out that deterred me from practising it. Reasoning from theory only, I imagined it to be impossible for young shoots made in August to ripen, forgetting the warm autumnal atmosphere of the orchard house. I do not hesitate to assert, that this simple step forward of pruning, by incessant summer pinching, is one of the most successful advances that have ever been made in fruit-tree culture under glass.

From closely observing my trees year after year, I have long felt that but little anxiety about pruning need be experienced by the beginner; for when a peach tree has been in a pot in an orchard house for two years, either under summer pinching or the usual spring pruning, it *will* bear, prune it how you will. All that seems to be required is, to make the tree symmetrical, and prevent its bearing too bountifully; for it must be borne in mind that fruit from a tree overloaded, whether under glass or in the open air, is never of fine flavour. Peaches, pears, plums, apples, and indeed all descriptions of fruit, suffer in flavour to an extent scarcely thought of, if the tree be allowed to bear too many. It is better to have one dozen of peaches large and of fine flavour, than two dozen small and inferior; besides this, a tree suffered to bear too large a crop will be sure to fail the following season.

GENERAL CULTURE.

I need not repeat here the directions for general management I have given for apricots: exactly the same is required for peaches and nectarines, which may be grown with them; the same top-dressing, liquid-manuring, syringing, root-pruning, and winter management. In summer the soil in the pots must not be too much saturated with water, or the leaves of peach trees will turn yellow.

Peaches and nectarines, either in the open air or under glass, are inclined to grow too vigorously: pot culture here gives a great advantage. The trees should be lifted, so as to break off all the roots that are entering the border from the apertures at the bottom of the pot: this operation should be performed once a week, commencing the second week in June (see Calendar, p. 131), and continued till the end of July; they may then be suffered to make roots into the border till the fruit is gathered. By this treatment the trees become sturdy and short-jointed; i. e. very short spaces will be found between the buds. Trees that have been from five to seven years in pots will require abundance of water daily, in summer; as the pots become full of roots, and absorb a large quantity.

VENTILATION.

There is a matter of importance in the culture of peaches and nectarines, to which I beg the reader's special attention, although it is a repetition, and that is free ventilation. In the warmer parts of England, and more particularly in Surrey, I have heard of failures in growing peaches and nectarines in orchard houses, owing entirely to the attacks of the red spider, brought on by the unskilful management of servants, calling themselves gardeners, who would persist in shutting up their houses at four o'clock in the afternoon in hot weather, and not opening them till nine in the morning; the poor trees were thus suffocated, and so enfeebled as not to be able to resist the attacks of this most persevering and insidious enemy. Now let me advise any one who has such a servant to open all the shutters about the first week in July, and have them nailed so that they cannot be closed; they may remain so till the 1st of September. If the trees are regularly syringed, no red spider will make its appearance, and the fruit will be of much finer flavour for this constant and free ventilation. The usual and proper mode of ventilation is to have the shutters open by day all through the spring and early summer months, and open night and day as soon as the peaches begin to colour, unless the house be in an exposed place, and the weather cold and windy, then they should be only partially open. But few gardeners have the courage to give air enough to orchard houses and vineries: in my lean-to vineries, without fire-heat, abundance of air is given night and day, from the middle of July till the grapes are ripe.

RETARDING.

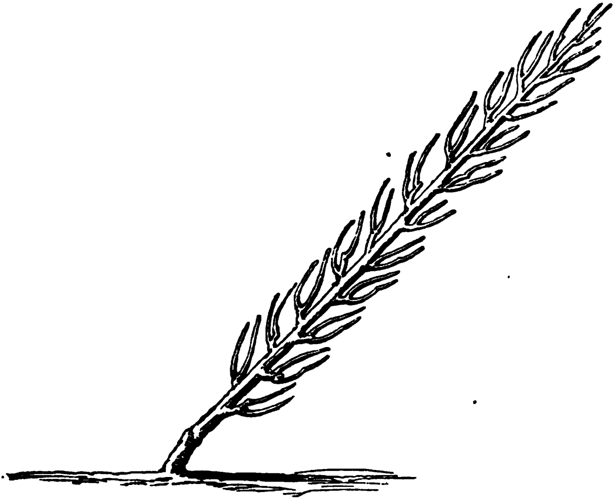
A very simple and agreeable method of retarding such mid-season peaches as the Noblesse, Royal George, and Grosse Mignonne, and all mid-season nectarines may be practised as follows:—Remove the trees from the orchard house to the open air at the end of July; place them in some warm sheltered place, or in front of a south or south-west wall, about two feet from it. In a few days both peaches and nectarines will change to a deep crimson, and, if the weather be sunny, their flavour when they ripen will be very vinous and piquant. Under this treatment, such sorts as I have named above will ripen by the end of September, or later, according to the state of the weather. By this method, the season of our fine melting peaches and nectarines may be much prolonged, and, in cases where the absence of a family may require it, the whole crop of an orchard house can be retarded.. Half-standard peaches and nectarines with nice round heads may be used as ornamental trees, in the same way as recommended for apricots.

PYRAMIDAL PEACH AND NECTARINE TREES.

Within these few years a method of growing peach trees against walls has been brought into notice in France. This is called training "en cordon oblique" (fig. 10), and is carried out by planting against walls maiden trees 20 inches or 2 feet apart at an "angle of forty-five degrees." The lateral shoots are shortened in closely, and rigid summer pinching is practised, so that a wall is soon completely covered with short fruit-bearing shoots. In warm climates and in dry soils this method has been found to answer very well, but has been objected to in climates and soils of a contrary description, as the vigour of the trees is not restrained enough by the most severe summer pinching. The French gardeners do not know, or will not practise, root-pruning or annual removal, which would doubtless make these very pretty trees abundantly fruitful. The annexed is a figure of one of these oblique trees, from the work on pruning by M. Hardy.

I now propose a modification of this mode of culture for the orchard house, by forming peach

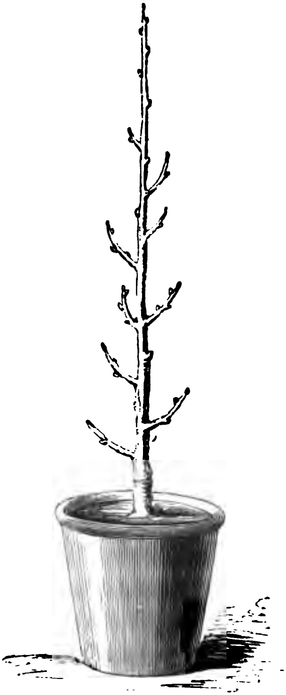
FIG. 10.



A Peach Tree trained "en cordon oblique."

and nectarine trees into close compact pyramids like an upright cypress, and annex a figure of a maiden tree potted and pruned (fig. 11). For this purpose maiden trees with straight stems and well furnished with lateral shoots should be selected, and planted in 11-inch pots. They should not be more than from 4 to 5 feet high; if more, their tops may be cut off to that height. Each lateral shoot should be cut in to two buds; these and the buds on the stem will in May give numerous shoots. As soon as they have made three leaves, pinch off the third leaf with the end of the shoot, leaving two, not reckoning one or two small leaves generally found at the base of each shoot, which are without buds in their axils, and will not put forth a shoot. These pinched shoots will soon put forth a fresh crop; *every shoot of this*

FIG. 11.



A Maiden Peach Tree pruned to form a close Pyramid.

and of all succeeding crops must be pinched off to one leaf, as soon as two or three leaves are formed.

If it be desirable to increase the height of the tree, the leading shoot at each pinching may be left with five or six leaves.

This incessant summer pinching of the shoots of a potted pyramidal tree, in the climate of the orchard house, will, in one season, form a compact cypress-like tree, crowded with short fruit-spurs. In spring, these, if too crowded, may be thinned out with a sharp penknife, so as to leave them as nearly as possible at regular distances; and in summer the fruit should be thinned, and the shoots pinched in, as directed above, every season.

A close fruitful pyramid will thus be formed, on which the fruit will be fully exposed to the sun and air. A great number of trees may in this way be grown in a small space, three trees occupying the space required for one bush, and they will form beautiful objects of high culture.

It will be seen from what I have already said, that the pinching in of pyramidal peach and nectarine trees differs slightly from that recommended for bush trees, in being more close. I must also recommend another slight variation, viz. instead of ceasing to pinch at the end of July, as with bush trees, pyramids may be operated upon till the middle or end of August. It is true that in the spring, when the blossom buds are swelling, many spurs will be found without leaf buds, but these may all be cut out and sufficient will be left. Unless late pinching is practised with pyramidal peach and nectarine trees, they are apt to become too loose in their growth, and their side branches long and bare of shoots and buds.

Pyramidal peach and nectarine trees may be planted in the borders of orchard houses with excellent results. They will require the same incessant pinching as potted trees, and *must be lifted and replanted annually in October*. There can be no escape from this, for if pyramidal peach or nectarine trees be suffered to grow two years in the borders of the orchard house without being lifted, no pinching or pruning will restrain their excessive vigour. They may be planted two feet apart, and they soon form fine prolific symmetrical trees. I have one of the "small span-roofed" orchard houses described in p. 16; this is 60 feet long, and each border is planted with pyramidal peaches and nectarines; the effect is admirable. There is one great attendant comfort in this mode of culture; trees, if top-dressed with manure, require but a small quantity of water.

MINIATURE PEACH, NECTARINE, AND APRICOT TREES.

These beautiful little trees are calculated to make a revolution in our desserts, so that it will ere long be thought a barbarism to serve peaches, nectarines, and apricots in dishes. They may be cultivated by summer pinching, in such small pots, that no inconvenience will be found in placing on each side of the plate of every guest a peach and a nectarine tree, about nine inches high, with from three to five fruit on each. If the pots are covered and ornamented, nothing can be imagined more charming.

To form these miniature trees, they should be grafted on small plum stocks (in 4-inch pots) of the kind known in nurseries as the Black Damask (Damas Noir of the French), in the month of January, and placed in a common garden frame, heated gently by a hot-bed or hot-water pipes. As soon as the young shoots have made four leaves, their ends should be pinched off, leaving three leaves, and all succeeding shoots pinched to one leaf. This summer pinching is never to be discontinued while the trees live, if it be intended to cultivate them as miniature trees. They should be shifted from the 4-inch pots they were in when grafted, to 6-inch pots in May, and to 8-inch pots about the middle of June. In these they must remain, without repotting, using the ordinary compost (always ramming it down firmly) of loam and manure when potting them, and the compost for top-dressing recommended in p. 38. The latter operation must be performed at the same season, and in the same manner, by taking out the exhausted mould halfway down the pots, as directed for the large trees.

SELECTION OF VARIETIES.

The peach and nectarine season may be much prolonged by a judicious selection of varieties.

The earliest Peach is the Red Nutmeg, which will ripen in July (it is small, but very nice); next the Early Anne and the Early York, which ripen immediately after it; then the Acton Scot; the Early Grosse Mignone; the Grosse Mignone; the Noblesse; the Royal George; the Galande; the Reine des Vergers, a beautiful and hardy new peach; the Barrington; the Walburton Admirable, a most *admirable* new sort; and the Late Admirable, of which the Téton de Vénus and Bourdin are excellent varieties: these ripen nearly in succession, are all melting peaches, and give their fruit from July till the middle of October. I am also inclined to think that with the large "Pavies" or clingstone peaches of France, such as Pavie de Pompone, Catharine, and some new late varieties recently received from Georgia, U. S., the peach season may be prolonged till the middle or end of November. These very late peaches, on walls in moist climates, are quite worthless; but in the dry climate of the orchard house, although not high-flavoured, they serve to prolong the peach season. They should be cut in slices and served with wine and sugar, as in France.

A selection of Nectarines may include the following:—Elruge; Hardwicke Seedling; Rivers's

Orange, very beautiful and very good; Violette Hâtive; New White; Roman; Early Newington; and Late Melting.

SYRIAN NECTARINES.

There is a race of Nectarines from Syria well worthy of especial culture; the best of these are the Stanwick and seedlings raised from it. Many gardeners have failed in its culture, finding it crack, and drop off in stoning. It is easily cultivated in pots, but requires an orchard house gently heated; the best of houses for the culture of this fine fruit is the small span-roofed with boards, and heated by one 4-inch hot-water pipe round the house. As soon as the trees are in blossom in April, the fire may be lighted every morning at six and kept up till five in the afternoon all through May, giving abundance of air in the day, and a portion by night, although the crevices of the boards will admit some. In June and July the fire may be lighted at six in the morning, and suffered to go out at mid-day; the trees must be syringed regularly. By this treatment the fruit will ripen in the South of England in August, be clear, free from cracks, and the most perfect and delicious of all nectarines; its flavour is most peculiarly gratifying, and I have no hesitation in saying that no fruit can be imagined more exquisite in flavour.

PLUMS.

The plum is a charming fruit not yet half appreciated.

"A rich green gage will soften a sage."

It is in season from July to November: it is excellent for preserves and for compotes.* And then how delicious are many of its varieties as dessert fruit! For the orchard house it is also well adapted; the early varieties ripen very early; the late kinds may be kept in muslin bags all through November; they shrivel in the dry climate, and are perfectly delicious. I have had some of Coe's Golden Drop in muslin bags on the trees, partaking of the flavour of those called "French plums," but richer and more agreeable.

Plums for potting may be grafted on the sloe (Prunus spinosa), but they are equally prolific when grafted on the plum stock: if they have been removed the year previous to potting, they will be full of blossom buds, and will bear a good crop the first season; if they can be procured already established in pots, the crop will be better and the fruit larger. The same compost and the same treatment recommended for apricots will do for plums; the same potting, pinching, and pruning, so as to make the trees nicely shaped, compact, and dwarf, is all that is necessary.

In selecting varieties some care is required, so as to have plums all through the summer and autumn. The very early and very late plums here in the South of England seem to ripen in the orchard house without any loss of flavour; but the mid-season plums, such as the Mamelonnée, Green Gage, De Montfort, and, I may add, the Jefferson, are, I think, improved in flavour by being ripened in the open air. About the end of June they should be removed to some warm and sheltered situation. Their flavour is, I think, improved by this treatment; and their removal will give more room to the peaches and nectarines. In wet and moist climates, where the Green Gage ripens with difficulty, they must remain under glass all the summer.

---

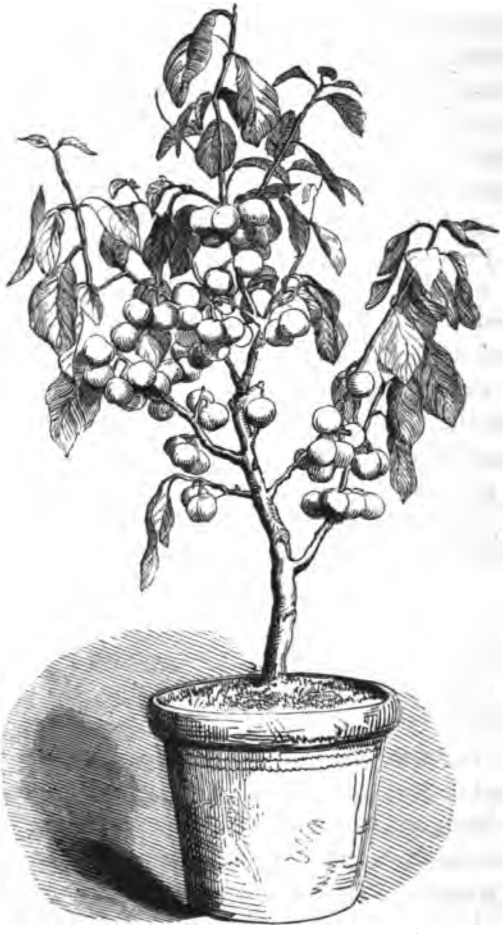
* French tarts without top crust, directions for making them are given in p. 155.

And now to our selection. For the first, take the Early Favourite and Early Prolific, two most excellent sorts, which ripen about the middle of July, nearly as soon as the Jaune Hâtive, a very early, but very inferior, plum; next in succession comes the Saint Etienne; then the De Montfort; the Denniston's Superb; and the July Green Gage; the Transparent Gage; the Green Gage; the Jefferson (rich and delicious it is); Purple Gage; Reine Claude de Bavay; Coe's Golden Drop; Ickworth Impératrice; St. Martin's Quetsche; Coe's Late Red, and the Late Black Orleans: all these are excellent, and ripen nearly in succession as I have placed them. A very nice way of keeping the autumn plums, or indeed those that ripen in summer, from wasps and flies, is to form the trees into compact bushes, which may be enclosed, when bearing fruit, in a muslin bag (any common cheap muslin will do), tying it tightly round the stem of the tree, so as to exclude the ants, which are great pests in dry and pleasant places. I have only to remark that the plum in orchard houses will to a certainty always give abundant crops, and as certainly ripen its fruit: in short, its culture will be sure to give satisfaction to those who love gardening.

PLUM-TREE HOUSES.

After some years of experience, I have found the plum so easily grown in pots, that I feel a new era in their cultivation has arrived. It is well known that plum trees in our climate bloom so early in spring as to be much injured by our spring frosts: it may safely be asserted that a fair crop of Green Gages, away from walls, is realised but three years out of seven, even in the South of England, but two years out of seven in the Midland Counties, and seldom or never in Yorkshire. Now, I propose that, for those who wish to grow a regular and certain crop of plums without incurring a heavy expense, rough-built lean-to orchard houses should be erected in some out of the way corner of the premises, consisting of larch poles, rough half-inch boards, with two or three sliding shutters for ventilation,—in fact, merely a glass-roofed shed on purpose for protecting plum trees in pots while in blossom and setting their fruit. It is surprising with what vigour and beauty plum trees blossom even in the rudest glass structure, and as the trees need not remain in the house longer than the end of the first week in June,—for then all danger of severe spring frosts is over,—they may be placed so close together, that a house 20 feet by 12, with a path in its centre, will hold ninety-six trees, forty-eight on each border. The trees may be planted in 13- or 15-inch pots, and treated exactly as other orchard-house trees; with this difference,—all the trees having young fruit should be removed from the house on the 7th of June, and placed in rows or otherwise in the garden to ripen their fruit in the open air. The pots may be plunged in the soil one third of their depth, but not more; for if the roots are too cold the fruit will suffer in flavour; and if the soil be wet and cold it should be drained or made porous, so that the water may pass from the pots rapidly, and the top-dressing of manure must be most abundant. As a matter of course, the very late plums must be ripened under glass; but all those varieties that ripen in the open air before the end of September may be there grown to great perfection, and regular annual crops insured, if care be taken to thin the fruit properly. If too large a crop be extorted, the tree *will* have a year's rest. It is quite astonishing how prolific these

Fig. 12.



Green Gage. 74 fruit.—From a photograph.

bushes become in a few years; and, by merely pinching off the ends of all their shoots to three leaves, they soon form themselves into compact round-headed trees, quite as ornamental as orange trees in pots and tubs, and far more gratifying as regards utility; for one would not like to place a dish of English oranges—cultivated as they are at present—before one's friends, but English Green Gages are always acceptable.

The best varieties for this extended mode of plum cultivation in pots are, the Early Prolific; De Montfort; Denniston's Superb; Green Gage; Angela Burdett; Woolston Black Gage; Kirke's; Guthrie's Late Green; Reine Claude de Bavay; Purple Gage; and, above all, the Jefferson, one of the most beautiful and delicious of plums. These are for the dessert; but, as in some climates it may be necessary to grow plums in the same way for culinary purposes, I may as well give the names of a few good kitchen plums: such are the Victoria and Autumn Compote, both large and excellent, ripening in succession; the Diamond; the Early Orleans; White Magnum Bonum; the Mirabelle; and Prince Englebert. The trees must all be removed to the orchard house the last week in October, top-dressed and watered, and then kept dry all the winter. As the earth of these out-of-doors orchard-house trees becomes very firm by the heavy rains of summer, an iron pick, to take out the mould in spring, will be found very useful. I have given a sketch in p. 40 of one which I had made by the village smith. I may add that, as plums are coarse feeders, I take the surface earth out to the depth of 6 inches at the side of the pot, sloping upwards to the stem, so as to be able to give them a large quantity of fresh compost.

To those who wish to grow plums under glass in large quantities, I beg to point out another very simple mode of culture, viz. planting a house with bushes or pyramids, and removing them biennially to check their growth: one of our most skilful gardeners, Mr. Monroe, treats them in this manner, and finds that, after a few years, owing to the trees being every season loaded with fruit, they do not require removal, as they grow very slowly. When cultivated as pyramids in the orchard house they should be managed and pruned exactly as directed for apricots in p. 44, they should however be pinched to three leaves instead of five, as recommended for apricots; and when cultivated as bushes, summer pinching to three leaves will be found by far the best method of pruning.

CHERRIES.

The Cerasus Mahaleb, Bois de Sainte Lucie, or Perfumed Cherry, has been long employed on the Continent as a stock for dwarf cherries; it will grow well in calcareous and shallow soils, unfavourable to the common cherry stocks. It is a very good stock for trees for potting; when grafted or budded on it, they form beautiful dwarf bushes: the May Duke and Morello cherries, of which there are several varieties, do much better on it than the Bigarreaus and Hearts, which are apt to gum, and grow too rapidly in proportion to the stock. Cherries are well known to be difficult to force, or to grow under glass: the blossoms generally fall without setting their fruit; but in our well-ventilated orchard houses this is not the case.

Their potting, compost, and treatment may be exactly the same as that recommended for apricots: the tree should be formed into a nicely shaped bush, with regular divergent branches; on each branch the shoots, all but one leader, must be pinched back in summer to three leaves, and the leading shoot shortened in August to about 6 inches, till the tree has attained the size desired; the leader may then be shortened to 1 inch annually, and the branches thinned when they become too crowded. The best early cherries for the orchard house are: the Empress Eugénie; the May Duke; the Archduke; the Belle de Choisy; the Royal Duke; and the New Royal, a very large and fine sort;—which ripen in succession. Then of the Heart Cherries and Bigarreaus, the very earliest of all is the Belle d'Orléans; then the Early Purple Guigne; Knight's Early Black; the Black Eagle; Elton; Bigarreau Napoléon; the Bigarreau; and the Florence: I have placed them as nearly as possible in the order of their ripening.

Of late cherries of the Morello tribe, which succeed admirably as dwarf bushes, there are: Reine Hortense, a large and delicious sweet cherry; the Late Duke, also sweet, and of the highest excellence; Griotte de Chaux; Coe's Late Carnation, a most delicious late cherry; Belle Magnifique, a very large Morello-like cherry, but not very acid; and the Morello, which, when fully ripe and black in September, is not to be despised as a dessert fruit. All these may be made to supply the dessert through August, September, and indeed great part of October, by enclosing each bush in a muslin bag, tied tightly round the stem near the ground: the dry air preserves them from mould, and the warm climate gives them a flavour very superior to that of late cherries matted up against walls, or indeed cultivated in any other mode. Cherries under glass are very liable to the attacks of the black aphis. There are two remedies for this pest: brushing the shoots, as directed in p. 123; dipping them in strong tobacco water; or covering the bush with a sheet of tiffany or calico, and placing ignited tobacco paper in a small flower-pot under it, so that the draught through the aperture at bottom is open. This is a good method of fumigation.

CHERRY-TREE HOUSE.

In wooded districts it is almost impossible to taste cherries fully ripe, so numerous and destructive are birds: in such places cheap orchard houses might be built for their sole culture, in which the ventilators should be kept constantly open as soon as the fruit begins to colour, but the openings should be covered with netting to keep out their winged enemies. They grow remarkably well in pots, and in a few years become most fruitful, every spur giving a bunch of blossoms; nothing can be imagined more cheerful than a cherry orchard house when the trees are in full bloom in April and May. Pyramidal cherries, either in pots or planted in the borders of orchard houses, removed biennially and pinched to three leaves,—by which must be understood that every young shoot (all through the spring and summer), as soon as it has made four leaves, should be pinched to three,—cannot be too highly recommended for orchard-house culture, for they soon grow into beautiful and fruitful trees. I scarcely know any fruit tree more charming than a May Duke or Empress Eugénie cherry tree, with its shoots pinched so as to form a compact pyramid, covered with fine ripe crimson fruit.

FIGS.

The fig is not a general favourite; but to those who like them their cultivation in the orchard house is interesting and most simple.

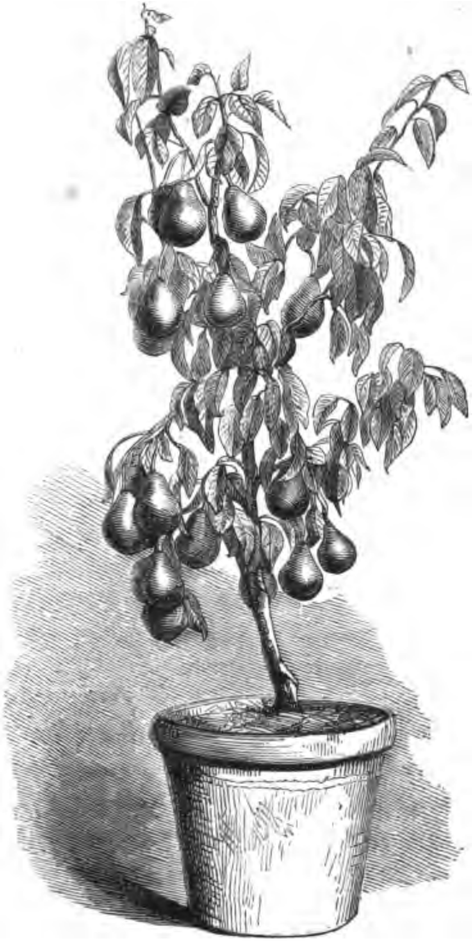
Figs may be planted in the compost already recommended, and in pots of the same size, top-dressed in spring, syringed in summer, and put to rest in autumn, and treated exactly as other fruits. Although fig trees against walls require protection from the frost,—which would otherwise destroy the young fruit which is the first to ripen in early summer,—yet under glass, with the mould perfectly dry and the shoots thoroughly ripened, they will be uninjured by the most severe cold. If a well-formed bush cannot be procured, the tree must be cut down the first season to within 9 inches of its base; the shoots, when they make their appearance, thinned out to five: when these are about a foot in length, pinch off the end from four, leaving the central shoot for a fortnight or so to grow longer; then pinch off its end in the same manner. Your bush will be formed, but you must not expect any fruit the first season. In succeeding seasons it must be pruned in the same manner that you would a bearing tree purchased and placed at once in the house; i. e. in May or the beginning of June, as soon as the young shoots have made five leaves, pinch out the terminal bud of each: they will then give fruit for a second crop, the first crop having been produced by the shoots of the preceding year. And to keep your trees as compact bushes, never allow any shoot to make more than five leaves without pinching out the terminal bud with the nails of the finger and thumb. The tree will, in a year or two, become too much crowded with young shoots; thin them with a sharp knife, leaving no spurs, but cut close to the main branch or stem. Figs like more heat than any other fruit yet mentioned; they may have the warmest corner of the house, not requiring much ventilation. A house with fire-heat is indeed necessary for them, if two crops in the season be wished for. In 1857, figs in common orchard houses ripened two crops of fruit in several instances. They must have abundance of water, or the fruit will all drop when nearly full-grown, without ripening. The varieties best adapted for pot culture are, the Early Violet, the White Marseilles, and the Brown Turkey, or Lee's Perpetual: if more varieties be required, the Angélique and Black Ischia may be added.

To those who have not much orchard-house room, the following method of growing figs may be useful. In the summer of 1857 I happened to visit Altenburg, a small town, the capital of the Duchy, about twenty miles from Leipsic. In the kitchen-garden of the castle I observed some fine half-standard fig trees with very stout clear stems and round heads full of fruit, then (August) nearly full-grown. Aware of the coldness of the climate, the thermometer often descending many degrees below zero in winter, so as to kill fig trees in the open air, I inquired of the gardener how they were managed. He stated that every season, in October, they were taken up with their balls of earth and placed in a cellar, where they remained till the first week in May: they were then brought into the kitchen-garden and planted in a row as I then saw them. He said they always ripened one abundant crop of fruit in September. I have reason to believe that standard figs treated in this way would also ripen one crop in the neighbourhood of London, so that every suburban garden may boast of its fig tree in summer. In the eastern and southern counties, they may be cultivated after this manner with a certainty of success.

PEARS.

In the South of England, pears can be grown on pyramids with so much success, "barring" spring frosts, that there is no occasion to let them occupy room in the orchard house; still, in seasons like that of 1850, when, in even the most favoured districts, all the blossom was destroyed by spring frosts, I felt much gratification in having about a dozen trees in pots, on quince stocks, covered with fine fruit,—and more highly-flavoured Brown Beurrés I have never tasted. Their culture is very simple, for trees on quince stocks that have been root-pruned may be potted any time in the autumn or even as late as February, and yet give a crop the first season after potting; as they set their fruit very thickly, they must be severely thinned the first season, and eight or ten pears ought to be the maximum of a crop. In two or three years a well-managed tree will be able to give from eighteen

FIG. 13.



Louise Bonne Pear. 18 fruit.—From a photograph.

to two dozen finely grown fruit. In the North this method of culture will be found both eligible and interesting; for glass without fire-heat will give just the climate suitable to the finer sorts of pears.

The pear tree, when grafted on the quince, seems to be quite at home in a pot. I have some trees that have now been seven years in 13-inch pots; they are in the most perfect health, and the stock seems to swell with the graft, showing that existing circumstances are favourable to its growth. I am inclined to attribute this healthy state of the stock, and consequently of the tree, to the roots of the quince enjoying, if I may so express it, the warm atmosphere which surrounds the pots during the whole summer; for my trees have been placed, unplunged, out of doors in the sun: in warm dry soils, however, to economise water, it would be advisable to plunge the pots two thirds of their depth in the soil. Pear trees are gross feeders, and should have three or four surface-dressings of manure during the summer.

Pears deserve to be grown extensively in orchard houses; and in climates liable to spring frosts, or in gardens having but little space for the finer kinds of pears on walls, a pear-house may be built, as recommended for plums. The trees may be treated exactly in the same way, and abundant crops obtained. Pears ripened under glass require attention as to the proper time of gathering. They must not be suffered to hang too long; for in 1854, and again in 1855, in two or three instances, I had pears on my trees which were grown under glass all the season; these, although of fine size, and most beautiful in appearance, having clear skins of a fine golden colour, without speck or blemish, never became soft. I was for some little time, I must confess, entirely at a loss to account for this curious fact, as all circumstances seemed so favourable to the ripening process; but I believe I have now discovered the cause. In the autumn of 1855 I allowed some Louise Bonne pears, some Passe Colmar, and a few other kinds, growing in the open air on trees well sheltered so that no wind could displace them, to remain on the trees till the first week in November; they were remarkably beautiful, both in form and colour, and the fine dry weather we had for so long a period seemed so favourable that I felt unwilling to gather them: these pears never ripened. I am, therefore, led to conclude that pears under glass should be gathered early, i.e. as soon as they will part from their foot-stalks when lifted, which is generally about the middle of September. From not being disturbed by the wind when under glass they will hang a long time, and one is loth to rob the trees of their ornaments: they thus become hard and worthless from a species of over-indulgence.

From recent experience, I am induced to recommend that in the South of England pear trees should always be removed from the orchard house in July, and suffered to ripen their fruit in the open air, in a sheltered yet sunny situation; their flavour will then be piquant and racy,—more so than that of fruit gathered from wall trees.

The trees should be formed into bushes or pyramids, as recommended for apricots, plums, &c.; all the young shoots should be pinched to three leaves in summer, so that the tree gradually, but slowly, increases in size, every part being furnished with blossom buds. An abundant top-dressing of manure, as recommended for apricots, must be given in spring, even laid up above the rim of the pot; and such gross feeders are they, that manure-water may be given to them every day in hot weather in summer with advantage. The most prolific and eligible sorts for pot culture are: the Brown Beurré; Easter Beurré; Glou Morceau; Bergamotte d'Espéren; Beurré Superfin; Gansel's Bergamot; Doyenné Gris; Beurré d'Aremberg; Beurré de Rance; Louise Bonne; Marie Louise; Passe Colmar; Joséphine de Malines; Crassane; Winter Nelis; Thompson's; Prince Albert; and Van Mons (Léon le Clerc). The above are all autumn and winter pears. If summer pears are desired, Doyenné d'Eté, Jargonelle, Citron des Carmes, and Colmar d'Eté, may be potted. In the North, where these early varieties do not ripen kindly in the open air, their culture under glass will give much satisfaction, for they may be brought to the dessert with their fruit in full maturity. I need not, I trust, say more about this really new and interesting mode of cultivating pears. My readers will, I think, see its advantages, and many of them venture to put it in practice. If I lived in an unfavourable pear climate, and wished for a certain supply of fine winter pears, I should fill a house with those two most delicious kinds, Josephine de Malines and Winter Nelis, which, unlike some sorts, ripen under glass with their full flavour.

When cultivated as pyramids or bushes in the orchard house, either planted out or in pots, they may be pinched as recommended for cherries, p. 77.

GRAPES.

For some few years it has been the fashion for gardeners in lordly places to grow grape-vines in pots, which, after bearing one crop of fruit, have been destroyed. Now these pots are generally of such large dimensions as to be quite out of character for our orchard houses, and totally unfit for the amateur who wishes to be master "of all he surveys." By observing in the land of the vine that grapes, and good grapes, could be grown on very small bushes, and in crevices containing but a scanty portion of earth, I was induced to try their culture in comparatively small pots, without destroying them after giving their first produce, continuing their culture without shifting, but top-dressing them annually, suffering their roots to feed in the border during the summer, and then root-pruning and managing them in the same way as other orchard-house trees. This has succeeded admirably, and my vine bushes have been beautiful objects, bearing from four to six bunches of nicely ripened grapes.

To form these bushes but little care is requisite; a vine one or two years from the eye, with a single stem, must be selected, and potted into an 11-inch pot, in the same compost as recommended for other fruit trees, adding to each pot a quart of 1-inch bones, well mixed with the mould; then cut the vine down to within eight buds of its base: the three lower buds must go for nought; the five upper buds, if the wood be well ripened, will give each a bunch. The lower shoots should be stopped, their tops pinched off as soon as they are 4 inches long: the upper five shoots may be suffered to grow till the bunch be perceptible; these may then be stopped one bud above the bunch, and all lateral shoots that afterwards come forth may be stopped at two buds from the base of the shoot they spring from. No other pruning will be required during the first season than this finger and thumb pruning. It is quite possible that some of the five buds may fail to give a bunch; no matter, stop them at the same length as the fruit-bearing shoots, so as to make a uniform pretty bush; for the vine in all sites and situations, and in all stages of its growth, is a beautiful object. You will now have an upright stem with five divergent branches or spurs. Now, on the pruning of these spurs depends success; they will, of course, from being grown under glass, be well ripened, and the buds well developed. Begin at the stem, and count four or five buds upwards; the fourth or fifth will, in all probability, be nice and plump. This must be your fruit-bud. Cut down to it closely; then with a sharp penknife *cut out* two or three buds, leaving the terminal bud and another at the base of the spur close to the stem. This will give you a shoot, which is to be your fruit-bearing shoot for the following year. You will thus have on each spur two buds, one for fruit, and the other for wood.

In autumn, that part of the spur which has borne fruit must be cut down close to the shoot which is to bear fruit the following season, and this shoot must be pruned in the same manner to one fruit-bud and one shoot-bud. This pruning should be done early in October, as the buds are then fully developed, and much is gained by autumnal pruning. A vine treated thus will last for many years, and may be always kept as a dwarf bush: the main stem, in time, will swell, and not require the support of a stick.

The first season the cultivator must be content with four or five bunches from the vine; but if the annual autumnal top-dressing of the composts described in p. 38 be given, and in summer a weekly supply of manure-water, it will soon be able to bear eight or ten bunches, and become like one of those hardy prolific bushes one often sees growing in the crevices of rocks in the wine countries of Europe, which, in spite of the rough pruning they receive, always bear abundance of fruit.

An orchard-house bush vine, in the hands of an unskilful cultivator, may also be roughly pruned without any fear of losing a crop: — shorten every root in autumn to three buds; and in the course of time, when there is too great a crowd of stumps, thin them out. A fruitful bush will thus be formed, much like the stumpy vines in use in the wine districts on the Continent.

After their fruit is set, vines require syringing like other orchard-house trees. As soon as the fruit is gathered, prune off the roots which have fed them so bountifully all the summer, top-dress them, withhold water, and put them to rest for the winter. I may add, that vines do not need the extreme ventilation recommended for stone-fruits: a warm part of the orchard house will suit them best; or if a small house with a brick Arnott stove can be entirely appropriated to them, so as to force them, and have two, or even three, crops in the season, their culture will be most interesting. To do this, if forcing be commenced in January, put in one third of your plants, early in March another third, and then in May the remainder. I do not hesitate to say that a house appropriated to vines in pots will give more fruit than the same space of glass with vines trained to rafters in the usual manner.

The varieties best adapted for this bush culture are those that are very prolific; none are more so than the following:—The Early Malingre; the Purple and Black Frontignans, most abundant bearers; the Prolific Sweet Water; the Purple Fontainebleau, also abundantly prolific; the Esperione; the Grove End Sweet Water; the Cambridge Botanic Garden, a variety of the Black Prince, and a great bearer; the Chasselas Musquée; the Muscat St. Laurent; the Royal Muscadine; the White Romain; the Black Hamburg; and the Chaptal, which gives large and most beautiful bunches. It must not be forgotten that the berries must all be thinned when they have attained the size of small peas, or they will become crowded and inferior.

A VINEYARD UNDER GLASS.

Some years ago I was much struck with the vines in the gardens of the South of France, trained to upright stakes about 6 feet high, which, as my visits were made towards the end of autumn, I saw season after season loaded with fruit. They were pruned on the spur system, somewhat after the manner of pruning now practised in our vineries, but not so close. I then planted some in a border at the back of a lean-to house with a beech hedge for its back wall, to try if it were possible to grow grapes after the same fashion under glass. They grew and bore well, but the hedge-house I found was too cold to ripen their fruit in all seasons; so they were taken up, and in the hurry of business the idea passed from my mind, and the experiment was not carried out fully.

I have now, however, with the improvement that has taken place in building orchard houses, no hesitation in recommending this very interesting mode of grape culture in one of my small span-roofed houses 14 feet wide and 18 inches of glass in each side, as described in p. 16.

A house of this width and 30 feet long will hold twelve vines trained under the roof in the usual way, up one side and down the other. If however, the vines are planted in the borders, and trained to upright iron rods 6 and 7 feet in height and at 30 inches apart, which will be found the proper distance, it will hold 48 vines planted in two rows: one row to be within 2 feet of the side, and trained to 6-feet rods; the other 4 feet from it, next to the central path, and trained to 7-feet rods. Each border will thus serve for 24 vines. They should be pinched in in summer and pruned in autumn, in the same manner as directed for bush vines in pots (p. 86); or, if the minutiæ of this mode of pruning be irksome to the amateur, he has merely when pruning in October to cut the shoot down to two eyes, not leaving more than two stumps (the pruned shoots) to each joint. The vine will have these all up the stem, at intervals of about 6 inches. I may mention that but little pruning science is required. I have a row of vines in the open air growing in a sandy soil, which, with the rough pruning they receive from one of my labourers (as I merely give directions to prune the stout well-ripened shoots to two eyes, and cut off close to the stem all that are weak or not ripe), never fail to bear every year most abundantly.

It may be questioned if the vines will bear fruit from "top to toe." Perhaps the lower part of the stem may fail; still, if each vine gives fruit on only two thirds of its height, the produce will, I doubt not, be much heavier than from vines trained under the roof in the same space. Twelve roof vines may give 20 bunches each, or 240 in all, a most abundant crop. Forty-eight vines trained to rods may give at 12 bunches each (a low estimate) 576 bunches, or an increase on roof cultivation of nearly 100 per cent. There is besides this the pleasure of walking among one's vines, and of being able to prune and train, and thin the bunches and berries without having the eyes strained by constantly looking upwards to the roof. The borders for these upright vines should be well forked over to a depth of 20 inches, and be enriched with a dressing of manure, half-inch bones, and lime rubbish, well mixed with the soil in stirring it. It may be advisable to annually root-prune and dress the vines, after the manner of the Zante vineyards, as mentioned in p. 147; but this must be a matter of experiment, to be carried out by the zealous amateur. I can imagine but few things more agreeable than walking in a vineyard under glass while the vines are in bloom and in fruit.

Strong-growing and good-bearing sorts should be chosen for this kind of culture, such as Black Hamburg, Trentham Black, Black Prince, Chaptal, Chasselas Vibert, Royal Muscadine, Muscat de Sarbelle, Muscat St. Laurent, &c.

The 14-feet wide span-roofed orchard house seems to me the most eligible and agreeable of all for a vineyard under glass. It should stand endwise north-east and south-west, so that the sun may shine all the morning on the south-east side, down the middle about one o'clock, and on the north-west side all the afternoon. This description of house appears much more agreeable than the span-roofed houses without sides recently patented by Sir J. Paxton, and can be built at a smaller cost than one of those "hot-houses for the million" recently advertised. Judging from the figures given, these are like the "ten-pound vineries" invented by Mr. R. Warren of Broomfield; and, as vineries for the roof culture of grapes, they will be undoubtedly useful.

APPLES.

There are a few delicious American apples which require more sun and a drier climate than our "tight little island" can boast, and these I feel convinced may be cultivated in the orchard house with success. They should be grafted on the Paradise stock, be planted in the same-sized pots as other orchard-house trees, in the same compost, and have the same treatment with regard to summer pinching as apricots, both as pyramids and bushes. The only sorts I know at present worth this trouble in the South of England are some foreign varieties, among which are the following sorts of American apples: the Newtown Pippin; the Northern Spy, a delicious, large, handsome, and good-keeping apple, with half-melting flesh; the Mother Apple; the Reinette du Canada; and the Melon Apple. These seem to require a warmer climate than the open air even of our southern counties. The Male Carle, a favourite Italian apple, may also be tried. In the far North, however, some of our fine English apples may be equally worthy of a place under glass: such as the Ribstone Pippin; Cox's Orange Pippin; the Nonpareil; the Golden Pippin; the Golden Reinette; theVan Mons Reinette; Coe's Golden Drop; the Sturmer Pippin, and some others. I hope one day to see orchard houses on many a sunny slope in the Highlands; and why not? If art and wealth can overcome nature in making fruits grow instead of heather, the conquest will cause smiles rather than tears, and give a much greater amount of happiness than the "glorious victories" of our history.

MULBERRIES.

In the North this delicious fruit does not ripen kindly; in such localities dwarf trees, in pots, in a few years bear well, and ripen their fruit in great perfection.

I may also add that White Currants, which are seldom well ripened, and even then are very acid, may be grown to great perfection in pots under glass.

STRAWBERRIES.

On the back border of the lean-to orchard house—for, unless the front be partially of glass, the front border will be too much shaded—spaces will be found for strawberries in pots, and they give much pleasure and satisfaction; their fruit will ripen about ten days before those from plants in the open air, and to a certainty will not be spoiled by rain or vermin. Whoever has tasted fruit of the "British Queen" grown under glass, without being forced, will, I am sure, have a lively recollection of their being much higher flavoured than those generally gathered from strawberry beds.

Nothing in our orchard-house culture is so simple as the management of potted strawberries, and nothing will be so certain of agreeable results.

About the middle of July, take 6-inch pots (32's of the London potteries); place two or three large pieces of broken pots at the bottom, so as to lie hollow; then mix your compost, which should be two thirds loam—if rather stiff the better—and one third rotten manure. You are so far prepared for operating, but you still lack an implement; and what a strange one in the hands of a gardener! for it is neither more nor less than a pestle,—a wooden pestle, fashioned out of any stout stake, and perfectly rounded at bottom: now then take a handful of mould—nothing like the hand in potting,—put it into your pot, and give it a good pounding, and so keep on with a handful and a pounding, till your pot is full, quite level with the brim, for the earth will afterwards sink enough to retain water. You will thus, if you have done well, make your earth level with the brim, and as hard as a barn floor. Take the pots to your strawberry beds (and mind, there are but few strawberries known at present to be worth forcing or growing in pots in the orchard house; Keen's Seedling and the Seedling Eliza for early sorts*, and the British Queen and Carolina Superba for a main crop, will suffice), and place on the centre of each pot a runner which has commenced to make roots, or if no roots be apparent it will do as well, and on the runner place a small stone, to keep it from being blown off by the wind. Make no hollow place: do nothing but place it on the hard surface, as I have directed. If the weather be dry, water daily; and if the runner, as is often the case, pushes forth another runner, pinch it off. In two or three weeks the roots will have penetrated to the bottom of the pot; the plant may remain attached to its parent till the middle of September, and then all the pots may be removed to their winter quarters—some sunny place: they should be placed on rough cinders, and then plunged in sawdust or rotten tan. In February they may be removed to the orchard house or forcing house, as required: no shifting is requisite, and a plentiful crop will be the result.

---

* The May Queen strawberry has the reputation of being one of the best early sorts for Orchard-house culture.

Strawberry plants, treated in this manner, attain much strength and luxuriance in the autumn; their fruit-buds will be finely developed, and they will be all that the gardener can wish them to be. This very simple mode of treating strawberries for culture under glass is not new; it was pointed out to me by a market-gardener some years ago. I have practised it ever since, and am more than ever pleased with it. In growing strawberries in pots, it is the usual practice to place them on shelves close to the glass. In the orchard house at Hyde Hall I have seen, annually, remarkably fine crops; the pots are placed among the peach trees on the back border, 6 feet from the glass.

The following extract from the "Gardener's Chronicle" of June 7, 1856, seems to give a very nice mode of cultivating strawberries in pots:—

"In the garden of the Horticultural Society, in the year 1855, Mr. Gordon caused runners to be taken up from the ordinary plants in the open borders in the first week in August, and potted in 2½-inch pots (small 60's); the soil used was a mixture of rotten cow-dung and loam (quarter dung, three quarters loam). When potted, they were placed in a close frame until established, and when the roots had filled the little pots, which was in about four or five weeks, the plants were shifted in the same kind of soil as before, into 4-inch fruiting pots (48's). They were afterwards transferred to a fully exposed situation in the open air, where they remained until the first week in December, at which time they were removed to a border in an unheated orchard house, where they were kept rather dry during winter. On the 14th of March the pots were removed to the front shelf in a curvilinear vinery, kept at a temperature of 40° until the middle of April, when the temperature was raised to 55°. The plants were watered twice, when the fruit was fairly set, at an interval of three days, with a weak liquid manure, made with half-rotted cow-dung and water, allowed to stand a few days before using. The result was an abundant crop of excellent fruit."

ALMONDS.

To those who wish to be reminded of the "sweet South," by having almonds fresh and ripe from the tree, the orchard house will give one more tribute. Almond trees in pots require exactly the same treatment as peaches and nectarines; but the choice of the proper sorts is of consequence. The Sweet Almond in common cultivation, and which is so conspicuous in our shrubberies in March, with its bright pink blossoms, is not the variety to be selected. The only sorts worthy of cultivation are the Tender-shelled Almond ("Amande à Coque Tendre") and the Large-fruited Almond ("Amande à très gros Fruit"): the former has shells very tender and easily broken with the fingers; the latter gives large fruit, with shells not quite so tender. They require, however, even more air than peaches, while in bloom; and, if the weather be dry and sunny, they should be placed in the open air by day, removing them to the house at night: if this be inconvenient, they should be placed near one of the ventilators, which should be open night and day.

THE FORCING ORCHARD HOUSE.

THIS kind of fruit house may be built in the same way as the common orchard house; but it is necessary to nail felt over the boards to prevent its being too airy in early spring, when forcing is commenced. It requires skill and attention; still, with only common care, a house heated by a brick Arnott stove placed in the centre, or by hot-water pipes, will not disappoint the careful amateur gardener, and will give strawberries in March, grapes in May, and peaches and nectarines in June.

I have a house 30 feet long, with a brick Arnott stove in the centre of the back border, which is excavated for it. Everything thrives admirably. My forced strawberries, placed on the front border near the glass, root into it, and give me abundance of excellent fruit. In like manner, peaches, grapes, figs, and apricots may be forced with but little trouble, in fact with much pleasure and gratification. The three modes of heating are by a well-built flue, the brick Arnott stove, and hot-water-pipes: the first and second are about equal as regards economy; the last the most expensive, but certainly more agreeable than any other. A flue may be employed for houses under 50 feet in length, and 12 or 14 feet wide, efficiently; but not, I think, for houses above that length. Any country bricklayer can build one: its dimensions inside should be 9 inches deep, and 6 inches wide, formed by bricks on edge, covered with two layers of tiles. The furnace should be fixed low, so that there is an immediate ascent from the end of the furnace into the flue; and a gentle rise—3 inches in 20 feet—

should continue to the chimney, which may be of less diameter than the flue with advantage, according to some gardeners; it is not, however, of much importance. In building these *forcing* orchard houses the *constant* ventilation through the cracks in the boards must be avoided, or too much heat is lost: the boards must be rebated or be cased with asphalte felt; or, as bricks are cheap, the walls may be of brick, with the ventilating shutters in back and front. The forcing orchard house I have alluded to above is built with posts of larch cut once down, and covered with half-inch boards; these, being nailed on, were well tarred with Stockholm tar, and the felt (M'Neil's) then nailed on, and done over twice or thrice with boiling coal-tar, in which lime that had been slaked a fortnight was mixed to the consistency of thick paint: this has formed a shining imperishable mineral coat. I know of nothing equal to it for felt, clay, or lime walls or fences.

I have said that bricks may be used; but although I have many plant houses built with bricks, I have not employed them in orchard houses, or even houses for forcing roses, &c. My preference for boards covered with felt for forcing houses may be owing to imagination; but I may as well state *why* I have preferred and still prefer them. It is because I have found them fiercely hot during the day, even in moderate sunshine, the evil effects of which are easily modified by abundant ventilation, and agreeably cool during the night, without that stifling atmosphere peculiar to houses with brick walls, only because bricks give out heat for many hours after sunset. Now, in thus rapidly cooling down, they certainly approximate to the descriptions given of the climate of the East, the birthplace of all our choice fruits; and so my peaches, nectarines, grapes, and figs grow and do well in houses with their walls of half-inch boards and felt.

To show how unnecessary it is always to abide by fixed rules, I must however give my experience with a small span-roofed house boarded at the sides (the boards not rebated and so there are crevices), fitted with hot-water pipes, two flow and two return.

I commenced forcing peaches and apricots in this house about the middle of January. I could always feel small streamlets of air making their way into it from each side, but, as the hot-water pipes are there, these small currents of air were warmed in their passage over them; and the house being by these crevices so well ventilated, I had no occasion to open the shutters till late in March, in hot sunshine, when the fruit was set and swelling fast, and every tree in health. In severe weather in February the fire was kept up with more care, just to keep the thermometer up to 35°; so that in a house of this kind, when forcing is not commenced *very* early, a little more fuel, owing to loss of heat by the crevices in the boards, will remove a world of anxiety about giving air.

Forcing of peaches and nectarines in pots, unless the fruit be required to ripen very early, i. e. in April or early in May, is not a difficult operation. The trees should be removed from the orchard house to the forcing house in December, and towards the end of the month have a good supply of water, so as to thoroughly moisten the earth; if severe frost comes on, a fire should be lighted at night to keep the earth in the pots from being frozen. About the middle of January forcing may be commenced, the temperature by day kept up to 50° by fire-heat (if the sun shines it will mount up to 60° or 70° for a short time without injury to the trees), the night temperature may go down to 40°. The trees should be syringed twice a day with tepid water; this will soon make the blossom buds swell: and when they are fully open, which will be in about twelve days, discontinue syringing, and, if the weather be mild and sunny, give air very freely in the day and a little by night, so that no stagnant moist air, so fatal to the blossoms of the peach, may exist in the house. If the weather be keen and frosty, air must still be admitted, and a brisker fire kept up, so that the temperature may not be lower than 50° by day and 36° by night. Close worsted nettings, or Haythorn's hexagon netting, placed over the ventilators inside, will allow of air being given night and day, even in frosty weather, without injury to the blossom. As soon as the fruit is set and begins to swell, syringing twice a day with tepid water may commence; a day temperature of 60° and a night of 40° to 45° should be kept up, and, when sunny, abundance of air may be given, for the thermometer will then rise to 80° and 90°. Instead of lowering the fire, which may lead to inconvenience, admit more air to lower the temperature, for gleams of sunshine in our early spring months are not of long duration, and the temperature is completely at command by the ventilators. To sum up, give brisk fire-heat and abundance of air by day; very little fire-heat, or none if the weather be warm, and a slight portion of air, by night: syringe twice a day— in the morning at 9, in the afternoon at 4—till the fruit commences to colour, and peaches and nectarines will ripen kindly early in June, and be of fine flavour.

Apricots, May Duke cherries, and Plums may also be forced; and although in large establishments the two former often have houses especially allotted to them, as they require much care to fully succeed, yet a few trees placed near the ventilators, for they require even more air than peaches and nectarines, may do very well with them. It is a good practice to thin out the clusters of blossoms on the May Duke cherries with sharp-pointed scissors before they open, taking out quite half from each cluster.

THE HEDGE ORCHARD HOUSE.

Some thirty years since, I planted numerous beech hedges for shelter, standing with their ends S.E. and N.W. A few years ago their S.W. sides looked such compact green walls, 8 feet high, that I was tempted to rear against them four lean-to houses, each 40 feet long and 12 feet wide, 8 feet high at back, and 3 feet high at front, with a sunken path in the centre. The climate in these houses in the summer months is most delightful. Tea-scented roses, magnolias, and other shrubs liable to injury from our severe winters, thrive admirably, owing to the dryness of the soil and air. Apricots and peaches ripen about three weeks or a month later than those on walls; but, owing to the quantity of cold air admitted through the back hedge in spring, their blossoms often suffer in April, if frosts be severe. I found this to be the case in 1854 and 1855; this induced me to build some small span-roofed houses, 12 and 14 feet wide, 4 feet high at the sides, and, instead of using boards, to plant hedges to form the walls, —one of yew, the other of Siberian Arbor Vitæ. These are clipped twice in the growing season; they now form compact hedges, and seem to flourish all the better for the drip from the glass, which pours into them when it rains heavily.

The proper dimensions for one of these span-roofed houses should be: height at sides, 5 feet;

height to ridge, 9 feet; width, 14 feet. Yews or arbor vitæs may be used for hedges, as they seem equally adapted to bear the drip from the roof. The appearance of these verdant walls, when nicely clipped, is quite enjoyable.

I mention these span-roofed hedge houses, not only because their climate in spring, summer, and autumn, is most charming, and perfect as a promenade for persons in delicate health, but for their convenience in retarding fruits. The trees bloom ten or twelve days later than those in the regular orchard house, and generally escape injury from spring frosts; there is such a constant percolation of air through the hedges when the sun shines, that the healthy growth is surprising. If Royal George and Noblesse peaches are to be retarded, they may be removed from the boarded orchard house to the span-roofed hedge house from the first week in June till August; they will ripen about three weeks later than those left in it. Apricots, plums, and pears ripen well in these houses, and are always perfect in flavour; cherries are liable to be eaten by birds which creep through the hedges. The great charm of them is, their perfect ventilation without any trouble. For many kinds of greenhouse plants they will be found the best of summer quarters; the increased temperature in sunny weather, from 15° to 20° above the open air, and the absence of heavy storms, which so often injure exotics, when placed out of doors in summer, are most advantageous to their well doing.

THE TROPICAL ORCHARD HOUSE.

An orchard house for tropical fruits has long been with me a favourite idea, and recently, my daughter having returned after residing two years in the island of Grenada, it has received a fresh stimulus. The variety of tropical fruits there seems almost endless; some of them, if I may judge from description, are too rich, others too insipid, for English palates, and of the greater part the trees that bear them would require a house far beyond the means of the amateur not blessed with a large fortune. I will, therefore, for the present, confine myself to a tropical orchard house for fruit trees of moderate growth; not extravagant in its dimensions, and yet capable of giving many luxuries.

The small span-roofed house, with some little modification, described in p. 16, seems best adapted for this purpose. Its sides should be 5 feet in height, 3 feet of which should be 9-inch brickwork, and 2 feet (the upper part) of glass; with sashes 2 feet long, on pivots or hinges, at intervals of 5 feet, for ventilation in hot weather. It should be glazed with double-crown glass, which is very clear, and rarely gives occasion to scorching. Its height should be 10 feet, the path 2½ feet wide, and the borders on each side 4½ feet wide, raised with brickwork to 16 inches in height. In the centre of each border two 4-inch hot-water pipes should be laid, and then a flooring of slates laid across from wall to wall of each bed, so as to leave a space for a hot-air chamber: 6 inches of the brickwork must be carried up above the slates, so as to form a hollow bed with 6-inch edgings to support the mould, which must rest on the slates to form the perpetual hot-bed on which the pots are to stand. The compost for this border should be two parts turfy sandy loam, lumpy as possible, one part rotten dung, and one part bricks broken into small pieces from the size of a nut to that of a walnut, with their dust; these should be mixed with the above, to keep it open and favourable for drainage, and a border of mould made with it on the slates, four or five inches in depth. A perpetual hot-bed is thus formed.

So far this is a safe and necessary step; but the hot-bed will not heat the air of the house sufficiently in the damp and chilly days of winter. This must be done by two 4-inch hot-water pipes carried round both sides of the house, next to the walls, just above the surface of the borders.* The atmosphere of a house thus heated should range, in spring, summer, and autumn, from 70° to 90° (the latter only in sunny weather); and from 60° to 70° in winter, i. e. from the end of November till the middle of February.

---

* The tubular boilers made by Weekes and Co., of King's Road, Chelsea, are the most efficient for the high temperature required in the tropical orchard house: they have very great power.

It is well known that orange trees, cultivated in the usual way in France or England, never give fruit at all eatable, solely from the lack of heat at their ripening period late in autumn and winter. In Grenada (West Indies) they commence to ripen towards the end of October, in a temperature varying from 70° to 80°, or thereabouts; their flavour there, freshly gathered from the trees, is so delicious that they are far superior to those we receive from St. Michael's and other places, all of which are gathered before they are ripe. In our tropical orchard house oranges would ripen about Christmas. How agreeable to be able to gather a portion of the Christmas dessert from one's own trees!

The orange will, I have no doubt, form a distinguished feature in this mode of fruit culture. I will, therefore, commence with directions for its cultivation. As an ornamental tree in the greenhouse and conservatory, it is an old friend; and perhaps no tree in the known world has suffered, and does suffer, such vicissitudes, yet living and seeming to thrive under them. It *glories* in a tropical climate, and yet *lives* and *grows* after being poked into those cellar-like vaults used for its winter quarters on the Continent; it gives flowers in abundance under such treatment, and would even give its fruit—albeit uneatable—if permitted. Nearly the same kind of cultivation has been followed for very many years in England: it has rarely had heat sufficient to keep the tree in full vigour; and its roots, in pots or tubs, must have suffered severely from having been placed out of doors in summer on our cool damp soil, and in winter on a stone floor still more cold. If roots could make their complaints audible, what moanings should we hear in our orangeries all the winter!

In cultivating the orange for its fruit, the first consideration is to procure some of the most desirable varieties; such as the delicious thin and smooth-rinded oranges which we receive from St. Michael's, the Maltese blood-orange, and the Tangerin.

The Tangerin is of all oranges the most desirable, as it is a most abundant bearer, and produces fruit of as fine a flavour in the orchard house as at Lisbon. It requires, however, different treatment from that of the usual orchard-house trees; for, although comparatively hardy, it must have the shelter of a green-house or conservatory during the winter, so as to be protected from frost. The trees should be placed in their winter quarters the first week in November, and removed from them to the orchard house the first day in May. They may be suffered to bloom and ripen their fruit there, but, if wanted to ornament the terrace or any sheltered place in the pleasure-grounds, they may be placed out of doors in the middle of June, when they will ripen their fruit in October. In the orchard house it will ripen a little earlier, but, as the fruits remain on the tree in a perfect state from four to six months, it is of small import, so that they are sheltered from cold winds, where the trees are placed during July, August, and September. In October, they must be under glass either in the green-house or orchard house; and from the first week in November till May in the green-house only. In the course of a few years every well-appointed garden will have its Tangerin orange house; the trees planted in the borders of a 14-feet span-roofed house heated with hot water, to keep out frost in winter, would be both fruitful and beautiful at all seasons. Their habit is dwarf, and yet graceful, from the smallness of their leaves. They seldom, even in the orange gardens of Portugal, attain a greater height than from 5 to 7 feet. This delicious little orange is only eaten in perfection when fresh from the tree. In Lisbon it is sent to the dessert in clusters with leaves attached to them: unless these are quite fresh and green when the fruit is served, it is not reckoned in full flavour. If grown in the tropical orchard house, which, however, is not so congenial to them as a green-house, the trees should be placed in the coolest part of it, and have abundance of air in mild weather in winter: they will then bloom later, and set their fruit with greater certainty. They should be placed either in the common orchard house or out of doors in June (so that the fruit may ripen slowly), and replaced in the tropical house on the first of October.

The St. Michael's orange is well known for its thin rind and excellent flavour. A very superior sort, which I received direct from St. Michael's, seems to be a most prolific variety, for trees only one foot in height are full of blossoms and fruit. The treatment recommended for the culture of the Tangerin orange may be followed in cultivating this sort. The day is not far distant when we shall walk in orange groves in England; for Tangerin and St. Michael's orange trees, planted in the borders of a large span-roofed house, furnished with just enough of a heating apparatus to keep out frost, will grow well and bear well, so that it is quite probable our markets will be supplied in the autumn with Tangerin oranges freshly gathered from the trees, and full of the delicious aroma they are renowned for.

The Maltese Blood oranges are of two kinds, the oval and the round: they are equally good. The trees are not so prolific as the two kinds above mentioned, and seem to rejoice in a warm atmosphere; so that the tropical orchard house must be their home. My trees are thriving vigorously in a house heated gently, and kept moist by syringing twice a day. It will, however, be quite worth while to plant some trees of this kind in the borders of an orange house with others, for they may not require excessive heat.

There are also some sweet oranges cultivated in France, of which trees could be readily introduced; but the first-named varieties seem to me most worthy of the careful cultivation to be given them in the tropical orchard house. The first matter of import is the soil best adapted for the orange. There are many receipts given in our gardening books, but the most simple compost of all, and one that cannot fail, is the following:—Two parts sandy loam, from the surface of some pasture or heathy common, chopped up with its turf, and used with its lumps of turf about the size of large walnuts, and its fine mould the result of chopping, all mixed together; one part rotten manure at least a year old; and one part leaf mould. To a bushel of this compost add a quarter of a peck of silver, or any coarse siliceous, sand (calcareous sand and road sand are injurious); and the mixture will do for all the fruit trees of the tropical orchard house, as well as for oranges. In potting the orange it is better to commence with a pot too small rather than too large; for, unlike the peach or the plum, it does not feed rapidly.

and at once fill the pots with roots. Thus a tree two or three years old may be potted in a 9-inch pot, suffered to remain for one year, and then removed to a 13-inch pot perforated as for other orchard-house trees, in which it may remain (unless the house be very large, and a large tree be wished for) six, seven, or ten years. A portion of the surface soil should be annually removed early in February, as directed for other orchard-house trees, but not deeper than from 3 to 4 inches, and the pots filled up with the above compost; and about the beginning of March a surface-dressing of manure should be given. I have observed that the French cultivators strew fresh sheep's manure on the surface; they also place their trees in a pure peat earth. I have not seen this mode of culture in England, but it may be tried where peat is abundant. Two other surface-dressings of manure should be given, one in June, the other in the beginning of September. The trees will, of course, be placed on the hot-bed, or plunged slightly two or three inches into the mould. I am not, however, an advocate for plunging to any extent, unless very rapid growth be required; for I find that trees in pots, standing *on* a bed of heated mould and rooting into it, make a healthier, although a slower, growth.

As soon as the fruit is gathered, which ought to be by the beginning of February, when foreign oranges commence to be good, the trees should be lifted and root-pruned as directed for peaches, and top-dressed.

Orange trees should have a part of the house to themselves, divided by a light glass partition, as they require and will bear more ventilation than other tropical fruit-bearing trees. Thus both borders of the small span-roofed house should be appropriated to them, the other part of the house being occupied with mixed trees and shrubs. Air can then be given to them by opening the sashes on one or both sides, without interfering with trees and shrubs requiring less ventilation.

Orange trees when grown constantly under glass are liable to a black fungus on the upper surface of the leaves; this can only be removed with a sponge and warm water. They should be syringed with soft tepid water twice a day (at 9 A.M. and 5 P.M.) during the summer; and once a day in the morning, in sunny weather, in early spring and autumn; while the fruit is ripening in the winter, syringing should be discontinued. It is the custom to cultivate orange-trees in square boxes made of oak. I am inclined, however, to recommend pots perforated at bottom, as usual with other pots used for orchard-house trees; the slate pots made by Mr. Beck of Isleworth are very neat and even ornamental; with the usual five or seven perforations, they would doubtless answer very well. If wooden boxes be used they should have bars at the bottom, to allow the roots to make their way into the hot-bed.

The Mangosteen (Garcinia Mangostana).—There are, it is said, many kinds of this "most delicious of all fruits," varying in size, flavour, and fertility. Penang and Singapore are, according to report, the only places in which it is brought to perfection; the communication with these places is now much quickened by the overland route and steamers. Young trees of some of the most prolific varieties should be imported, and also abundance of young trees of some of the more common kinds, to be used as stocks for grafting, which, as is well known, often induces a tree to bear fruit. By these means fruit-bearing Mangosteen trees will soon cease to be rarities, and we may even live to see Covent Garden supplied with this rare fruit home-grown. The trees should be planted in the pots usually employed for orchard-house trees, and suffered to root into the hot-bed of mould on which they are placed: if they are inclined to grow too vigorously, they should be kept in check by lifting the pots; and, when the fruit is gathered, root-pruning and top-dressing in the usual way should be attended to. In short, to prevent repetition, the treatment recommended for orange trees will, as far as I can see, answer for all other tropical orchard-house trees.

The "Chirimoya" (Anona Cherimolia).—In our estimation this is the mangosteen of South America. A recent traveller in Peru (Markham) describes it as resembling "spiritualised strawberries and cream." It is said to attain its greatest perfection at Caraccas, owing probably to peculiarity of climate, as is the case with the mangosteen at Singapore and Penang. If there be any superior varieties in existence, they should be sought for at Caraccas; and, when tropical orchard houses are established, a consignment of Wardian cases filled with young trees from La Guayra (which is only about twenty miles from Caraccas, thus giving but trifling land-carriage) will, I have no doubt, be a safe venture.

The Pomegranate (Punica Granatum).—Although this tree does not in general bloom and bear fruit under glass, treated as it is in France and England, I am inclined to think that, like orange trees, it will succeed in the tropical orchard house. There is a large-fruited sort from Malta, and a seedless variety, both of them worthy of a trial.

The Lee-Chee (Euphoria Litchi).—This, even when brought over from China in a half-dried state, is, as I can testify, a delicious fruit; when fresh from the tree, it is said by those who have visited China to be most refreshing and excellent.

The Loquat (Eriobotrya japonica).—This is also a Chinese fruit which will ripen in the tropical orchard house in winter, and is therefore desirable; trees grafted on the common whitethorn will come into bearing more quickly than those reared from cuttings, layers, or seeds. The late Lord Bagot, according to Loudon, used to grow this fruit in great perfection at Blithfield: its flavour is mild and agreeable, something like a medlar.

The Guava (Psidium Cattleyanum).—This is the most prolific of the guavas, and bears most abundantly; its flavour is peculiar, and does not at first please all palates, but it is quite worthy of cultivation. There are also the Spice Guava, the size and shape of a lemon, with a white interior and a clove-like flavour; and the Large Yellow Guava, its inside red; both of them esteemed in Grenada, an island remarkable for the great variety of its tropical fruits.

The Granadilla (Passiflora).—There are many varieties of this fruit, varying in flavour, size, and colour, so that it is difficult to point out the best for our purpose. To some persons their flavour is most agreeable, to others the contrary. I suspect this must be partly owing to the variation of flavour in different sorts. Markham speaks of the Peruvian Granadilla as being delicious. My daughter from Grenada mentions the "Water Lemon," a variety of the Granadilla the size of a hen's egg, and full of a most refreshing juice, as a delicious fruit. They are all climbers, and should have a frame of iron wire placed in the pot to train them to.

The Mango (Mangifera indica).—There are numerous varieties of this fruit in India, more particularly in Java: some of the most free-bearing varieties should be imported, as it is likely to prove a valuable fruit tree for this species of culture. The late T. A. Knight cultivated mangoes with great success at Downton Castle. They were thought superior to the best Eastern mangoes, being free from turpentine flavour. Mr. Ivison, the skilful cultivator of tropical fruits at Sion House, is of opinion that the mango may be easily cultivated, as it does not require so high a temperature as many other tropical trees.

The Dwarf Plantain (Musa Cavendishii).—This fine and most prolific fruit-bearing plant will not group well with our other tropical trees and bushes, but a place should be found for it at the warm end of the house near the boiler. As it is a gross feeder, it must have a larger pot than ordinary; one from 16 to 18 inches in depth, and the same in diameter, will not be too large: such a pot will require at least seven apertures at bottom for the emission of roots. This plantain, however, roots so strongly, that care must be taken to lift the pot at least once a fortnight, and rather to give it fortnightly surface-dressings of manure than suffer its roots to spread too far,—in short, to feed it from above rather than from below.

The Rose Apple (Jambosa vulgaris).—According to Loudon, in his "Encyclopædia of Gardening," this is an agreeable tropical fruit, "about the size of a hen's egg, rose-coloured and white-fleshed, with the flavour of a ripe apricot," ripening in

December. Mr. Cattley used to have this at his famous hot-houses in Hertfordshire, of which now scarcely a vestige remains, and had great success in its culture, as his trees yielded regularly abundance of fruit. Mr. Ivison thinks this tree also will prove useful.

The Sweet Lime is a variety of the genus Citrus, the size and shape of a full-sized nectarine, with a thin and fragrant rind of a pale yellow; its flavour is like that of a very superior orange, with a delicious aroma, and so wholesome and refreshing is it, that "from twelve to eighteen may be eaten at once with pleasure and without injury to health." The tree is very prolific, and bears its beautiful fruit in clusters of ten and fifteen each; this is a fruit highly esteemed in Grenada.

The Sapodilla (a variety of Achras Sapota) is also a Grenadan fruit; it is the size and shape of a large lemon, with a brown rough coat, and a luscious juicy pulp, in which a few black seeds are embedded; it is commonly eaten with a spoon, and is in great estimation.

The Fig.—This may be made a most desirable tropical orchard-house tree, and so managed as to give its quota to the Christmas dessert. Trees of one or two years old, that have been protected from the winter in a cold pit, should be potted early in May into 13-inch pots, and protected from our usual May frosts by being placed in the orchard-house, or any cold frame or pit, till the first week in June. They may then be placed out of doors for the summer in a sunny exposure, sheltered from boisterous winds. Liquid manure may be given to them once a week, and they should be lifted once a fortnight, to prevent the roots, which would make their way through the bottom of the pot, from becoming too large. They may remain in their summer quarters till the end of September; but, if one or two of our early autumnal frosts occur in that month, they should be protected by having a piece of calico or a little hay thrown over them. At the end of the month they will be covered with young green figs, and if removed to the tropical orchard house they will ripen their fruit towards the end of November and through December. If it be wished to retard the ripening of the fruit on some of the trees, they may be placed in the common orchard house or a cold pit till the first week in November. They will then, on being removed to the tropical orchard house, mature their fruit even as late as January. The most prolific and best varieties for winter figs are the White Ischia (this is sometimes called incorrectly the Nerii, and is a most abundant bearer); the Brown Turkey, or, as it is often called, Lee's Perpetual; and the White Marseilles.

I have in these few pages given the outline of what may be done towards increasing our garden luxuries. The culture of tropical fruits is not a new idea; but I have endeavoured to give a new version of an old idea. There is now no occasion for the bark-bed, in which it was once thought necessary to plunge the pots containing the plants of all tropical fruits. A perpetual hot-bed on which to place the trees—which may or may not be a new invention—is now easily formed by hot-water pipes; and I well know, and again say, that a tree standing *on* a hot-bed will make a healthier although slower growth than one that is plunged *into* a bark-bed. Moreover, the latter is always disagreeable from its requiring to be turned and renewed, as well as from its unpleasant smell.

It will be seen that I have confined myself to the description of a comparatively small tropical orchard house; this I have done that I might be consistent. Large gardens have, for the most part, good gardeners, who know how to build houses, if the means be provided, much better than I can tell them; but, when the system of culture is understood, I can see no reason why large span-roofed houses should not be built, even in gardens of moderate size. The great object is to have abundance of heat at command: the central border, therefore, in a large span-roofed house, would require four 4-inch hot-water pipes, each side border two; and to heat the air would require four 4-inch hot-water pipes round the sides. In such a house the trees might be suffered to grow to a goodly size, and would give a great abundance of tropical fruits, from the delicious little

Lee-Chee to the exquisite freshly gathered Maltese orange.

I have been content with the enumeration and description of only a few tropical fruits: when their culture is better understood the list may be extended; for in all tropical climates there are numerous fruit-bearing trees and bushes utterly unknown to English gardens. It may perhaps be said that some of the kinds of fruit I have recommended will form trees too large for a house of the dimensions given: this ought not to influence the cultivator, for, as is well known, the fig grows into a very large tree when the soil and climate are favourable, and yet bears well in a pot of moderate size. Collectors have, for many years past, paid much more attention to orchids and pines than to tropical fruits, only because the culture of these has not been carried on in England with spirit. Let us hope that, owing to the introduction of hot water as a means of heating, the low price of glass and bricks, and the low price of timber, we shall see tropical orchard houses rising up, and rivalling the now numerous orchard houses in their agreeable productions.

INSECTS, AND HOW TO DESTROY THEM.

Numerous species of aphides under the name of "blight" are, as is well known, most troublesome enemies to all fruit trees in the open air, and orchard-house trees are not exempt from their visitations. Each species of fruit tree seem to have its peculiar aphis. There are, however, two which attack the peach and nectarine: the Brown Aphis, which often makes its appearance on the young shoots and buds in November and December; and the Green, which generally attacks the trees as soon as the fruit is set and the young leaves unfolded. These are easily destroyed with Tobacco-water, made by infusing two ounces of tobacco in a quart of boiling water, and applied when cool with a middle-sized painter's brush, in the following manner:—With the left hand place a piece of slate or glass against the shoot, so that it may rest against it, and then dip the brush in the water and brush upwards: if the first application does not kill them, it must be repeated.

This will destroy all the tribe, even the hard to be killed Blue Aphis peculiar to the plum, and the black which so often infests the cherry.

Another mode of destroying them is by Fumigation, which is the most eligible when a large number of trees are infested, or when the aphides make their appearance on the young shoots just before or while the trees are in bloom, making the application of tobacco-water hazardous. This is best done in the evening, and most economically with tobacco paper. The house should be shut up, and two or three (or more, according to the size of the house) 8-inch flower-pots, with large burning wood-embers at the bottom, placed on a tripod, or on two or three stones, so that there be a draught through the bottom, and then filled with the paper. The next morning the trees (if the fruit be set, otherwise not) should be syringed with all the force possible, by applying the syringe close to each. Another mode of fumigation (and this is convenient when only a tree or two are infested) is to envelope the tree in tiffany or thin calico, and then place under the covering a small pot of ignited tobacco paper. In all cases the dead and dying insects should be washed off with the syringe.

"Sigma's Aphis Powder," sold by Mr. Powell, Ticehurst, Sussex, is also a convenient and efficient aphis-destroyer: this is best applied, by means of a dredging-box with a muslin cover, to the under surface of the leaves: it should be suffered to remain on the leaves for eight or ten hours, and then be washed off with the syringe. The "Gishurst Compound" is also an excellent aphis-killer. It should be dissolved in soft water, 2 or 3 ounces to the gallon, and applied with the syringe; if one application be not efficacious, it may be applied two or three times, as it is very cheap.

In the orchard-house culture of peaches and nectarines, syringing must play an important part; for the Red Spider is so fond of their leaves, that, like Sindbad's Old Man of the Sea, he will stick closely, and cannot be dislodged without applying the syringe close to the under surface of them. If this pest be suffered to make the least progress, the flavour of the fruit will be entirely destroyed. A small pocket lens, in the hands of the amateur, will be the best instrument to discern it: looking closely at the under surface of the leaves, if it be there, a small bright-red speck, like a red grain of sand, will be seen. The experienced gardener does not look for them. One glance at the upper surface of those leaves which show some minute yellowish specks is quite enough for him. If, therefore, the least sign be apparent, continue the regular syringing, even till the fruit be ripe; otherwise, syringing may be discontinued when the peaches and nectarines commence to soften, preparatory to ripening.

A very excellent mode of using Sulphur has been given in the "Gardener's Chronicle," No. 1, 1858, p. 5, by Mr. Gardener, of Rossall Hall, Fleetwood. "The house being shut up quite close in the evening, some large flower-pots (say 13-inch pots) were half-filled with fresh unslaked lime: this was saturated with four or five gallons of water*, and a handful of flowers of sulphur strewed over it, and suffered to remain all night. The next morning the house was syringed most abundantly." This will not only destroy the red spider, but also the mildew on vines, and is, in my opinion, one of the best remedies ever discovered. As prevention is better than cure, I advise all lovers of orchard houses and vineries to apply it once a week through June and July. I am inclined to think that this simple remedy will do away with the necessity of the constant syringing I have recommended; and, if so, the fruit will be improved in flavour. It is at any rate worthy of a trial.

---

* In the fifth edition, "sprinkled" was used instead of saturated; and too large a "handful" of sulphur has been in some instances applied, from which some mischief has occurred. One ounce of flowers of sulphur is the proper quantity.

MONTHLY CALENDAR

FOR THE MANAGEMENT OF THE ORCHARD HOUSE THROUGHOUT THE YEAR.

January.

Observe the same rules for protection against frost, and give water, if necessary, as directed for December. In bright sunny weather the ventilators may be opened, to lower the temperature and prevent the blossom-buds from swelling prematurely. Paint the trees (every shoot and bud) with Gishurst Compound, half a pound to the gallon of water. This will destroy the eggs of aphides.

February.

Continue the same rules for ventilation and protection as directed for December: towards the end remove the trees to their summer stations, making one for each tree, as directed in page 39.

March.

Early in the month all the trees should be pruned according to the directions given under each kind of fruit. Watering may now be commenced, unless the frost be very severe, giving a quart to each tree, and gradually saturating the earth.

If the weather be sunny with sharp frosty nights, the shutters, both back and front, may be open from 9 A.M. to 4 P.M., and closed at night. If the weather be cloudy with frost, the shutters should be closed night and day. Apricots will sometimes bloom in the middle of this month, before the other trees. If the frosts be severe at night, it will be well to throw a piece of tiffany over such as are in bloom, removing it in the morning; this is so light that the blossoms will not be injured.

April.

Observe the same regulation as in March, as to ventilation. In the beginning of the month the trees will in most seasons be in full bloom. In sites near the sea, or in valleys where the air is damp, it will much facilitate the setting of the fruit if a camel's hair pencil be passed lightly over the anthers and stigmas when the trees are in full bloom, so as to disperse the pollen which sometimes becomes glued to the anthers, and does not lodge on the stigmas as it should do. When this is the case, the blossoms drop off without setting their fruit. I give my trees a sharp rap with a stout stick every day while they are in bloom. If severe frosts come on, which is sometimes the case, and the thermometer in the open air descends to 28° in the evening, a fire, consisting of six or eight quarts of charcoal, should be placed in an iron pan in the centre of the house; for a house 30 feet long, one pan will do; for one 100 feet long, three pans will be required. Whenever charcoal is burnt, the ventilators over the door or doors in span-roofed houses should be left open. Watering the trees thoroughly while they are in bloom (see p. 36) is of great consequence: the fruit often drops off if the earth which has been drying ever since November is not soaked through and through.

Towards the end of the month, when the fruit is set and commences to swell, syringe the trees morning and evening with soft water, or spring water that has been exposed to the air for a few hours. Place the syringe close to the under surface of the leaves. If the weather be dry and warm, the trees may be watered in the evening. The aphides will now begin to make their appearance. Their destruction must be seen to, as directed in pp. 123—126.

May.

Observe the same regulations as to watering and syringing the leaves as in April. Ventilation must now be strictly attended to; in all descriptions of weather the ventilators must be open by day from 8 A.M. to 6 P.M.; but, if the situation of the house be exposed, so that the N.E. wind can blow through it, it will be as well not to open the ventilators that will admit that or the east wind when it blows fiercely. Worsted netting, with meshes just large enough to admit the point of the finger, is a most excellent material to place over the ventilating openings inside, to remain all the summer. It softens the violence of a brisk gale, and yet admits plenty of air. It will be found most useful near large smoky towns, for the fibres of the worsted meet in the meshes and keep out sooty particles: insects also never attempt to enter. A clever orchard-house cultivator, living at Bow, near London, has found this worsted netting of great value; for his orchard-house trees are as green and as fresh in summer as if they were in the country, instead of being in the midst of smoke. Aphides will now be very active, and must be destroyed. Apricots will also be infested with a caterpillar in their young shoots: the ends of them must be pinched, so as to crush it. If trees, either bushes or pyramids, are to be under summer pinching* only, it may be commenced early in the month, as soon as the young shoots have made four or five leaves (see pp. 44—60).

---

* Although the word pinching is used, a penknife, to cut off the ends of the young shoots, is usually necessary.

June.

Syringing at 7 A.M. and 6 P.M. must now be strictly attended to; and, if the weather be hot and dry, the trees will require watering abundantly every evening. My trees in 13-inch pots and seven years old take one gallon each. All the ventilators should be open from 8 A.M. till 6 P.M. Some fresh top-dressing of the usual compost may now be added, if the surface of the earth in the pots be hard and close.

Commence to thin the fruit, and pinch in the laterals, as directed in p. 54, particularly of figs.

The red spider now requires particular attention, and the pocket lens must be brought into use: if syringing fails to completely extirpate it, lime and sulphur, as in p. 125, must be resorted to. Remove plum trees to the open air, to ripen their fruit, if there be a scarcity of room in the house; also apricot trees (see pp. 42—69).

On the 10th, and again on the 25th, lift the pots to break off the roots, and prevent them going too deeply into the border (see pp. 37—57).

Summer pinching of pyramids and bushes to be attended to.

July.

Thorough ventilation must be attended to; it is a good practice to fasten back and front shutters, so that they cannot be closed: syringing and watering as in June. If any of the trees are growing grossly and too rapidly (particularly figs), gently tilt up the pot on side, and cut off all the roots on that side that are making their way into the soil, and a week after do the same with the other side. Place some fresh compost loosely on the surface of the soil in the pots, if it be firm from repeated watering. Frequent surface-dressings in summer, of the compost mentioned p. 38, are better than manure-water. Recollect that powdered charcoal and ground coffee are deodorisers. Pinch in lateral shoots to within two buds of their bases, to prevent the tree being crowded with shoots and leaves (see p. 52). On the 10th and 25th lift the pots, as directed for June. The compressed earth in the pots gives vigour almost beyond belief.

Remove pear trees to the open air to ripen their fruit; also peach and nectarine trees (see pp. 59—84).

Summer pinching of pyramids and bushes to be rigidly attended to.

August.

Ventilation and watering the same as in July; syringing till the fruit begins to colour, or, if the house can be kept perfectly free from the red spider by lime and sulphur, discontinue it from the last week of July. Still pinch in laterals, and, at the end, pinch off the points of all the leading shoots, except figs,—these will not require any further pinching.

Remove peaches, nectarines, and apricots to the hedge orchard house, or to the open air, to retard their ripening, if required.

Summer pinching of peaches as pyramids still to be attended to.

September.

Ventilation as in August, unless the weather be peculiarly windy and stormy. In such weather the house may be closed: watering must be continued, but no syringing.

October.

Ventilation and watering as in September. About the middle of the month, every tree—except late peaches with their fruit still on them—should be lifted, and all its roots cut off close to the bottom of the pot; and about the 24th, top-dressing must be done (this is described in p. 38), and a gallon of water given to each tree. They may now be placed close together, so as to give room for other plants, particularly chrysanthemums, which bloom well in the orchard house all the autumn. Prune vines in pots (see p. 86). On no account remove peach, nectarine, and apricot trees to the open air in autumn to "harden their shoots," as some gardeners say; as if a moist cool climate would ripen the shoots better than the warm dry air of the house. They should remain in the orchard house all the year, except, of course, such trees as are placed out of doors to retard their fruit. These should be returned to the house, if possible, before the heavy autumnal rains come on, which saturate the roots, and do infinite mischief to the trees.

November.

Ventilation the same as in October. On the fifth give each tree a gallon of water, the last for the year. The autumnal top-dressing and watering encourage the emission of young roots; so that the tree is prepared for its fruit-bearing work early in spring. If the brown aphis makes its appearance on the young shoots and buds, use the brush and tobacco-water, as directed in p. 123.

December.

The house may now be shut up day and night. A registering thermometer should be kept inside; if at any time this denotes a night temperature of 20°, some dry hay or litter should be placed among and on the pots, to 6 inches above the surface; this will keep their roots from injury by frost.

If the weather be windy, dry, and mild, observe if the trees are inclined to shrivel from being too dry; if so, give each a quart of water at 10 A.M.; otherwise, no water all this month. If they shrivel from severe frost, it will not matter; for as soon as a thaw comes they will recover. Pay attention to the brown peach aphis.

If a heavy fall of snow takes place, it should be removed from the roof, or it may break through the glass.

CONCLUSION.

I APPEAR in the foregoing pages to have employed a great number of words in the endeavour to make plain this simple, agreeable, and novel mode of cultivating fruit trees. Judging from my own feelings, its advantages and pleasures are manifold. Each bud, leaf, and blossom is brought close under the eye of the cultivator. All the minute and beautiful operations of Nature can be closely watched in a genial climate. The silvery covering of the peach's blossom bud,—the beauty of its fully developed flowers (how fresh and happy they always look!),—the anthers shedding their pollen,—the germs gently swelling,—the downy, ruddy, luscious-looking coat of its charming fruit, are all calculated to give pleasure to the healthful cheerful mind; for the varied works of Nature's laboratory are brought near to the eye, near to the mind, near to the heart, which is instinctively lifted in thankfulness to the Giver of all such good and beautiful things.

APPENDIX.

I.

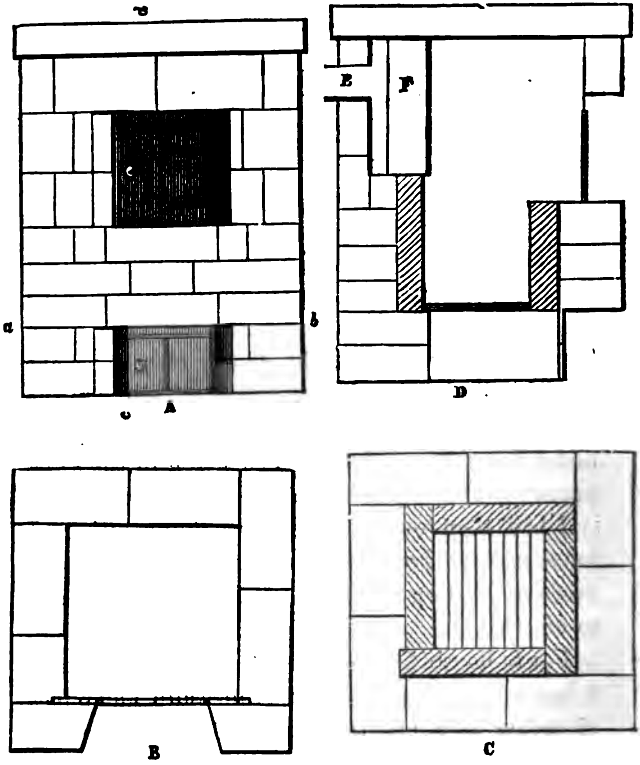
THE BRICK ARNOTT STOVE.

The following figures, the blocks of which have been kindly lent me by the editor, appeared in the "Gardener's Chronicle" for January 24th, 1846, and a description of them was given in the same paper for January 17th, in the same year.

I had then four of these stoves in operation; I have now twelve; and have never yet seen any mode of heating small or moderate-sized houses so efficient.

For a house 20 to 30 feet long by 12, a stove 2 feet 4 inches square, outside measure, and 3 feet 10 inches high, and the fire-box 8 inches over and 8 inches deep, will be amply sufficient. For a house 40 feet long by 12, one of 2 feet 10 inches in diameter and 3 feet 10 inches high, the fire-box 10 inches over and 10 inches deep, will also answer well. The stove should be placed in the centre of the house, within a foot or eighteen inches of

Fig. 14.



A, Front elevation. B, Ground-plan. C, Horizontal section through *a b* in A, showing the fire-bars or grating. D, Vertical section through *c d* in A, showing the front and back fire-lumps, the former reduced to nine inches in depth. E, Iron pipe leading to the chimney. F, Fire-lump, placed an inch and a half from the mouth of the pipe leading to the chimney, and about the same distance from each end; this causes the smoke to pass round, thus preventing a too rapid consumption of the fuel. The courses of bricks in height are laid flat.

the back wall, and the horizontal pipe* go at once into a chimney outside; or, what is better, the chimney may be built inside, and carried out of the back wall, just under the glass. By this method no heat is lost. If it be thought necessary to have the feeding-door and draught-door outside, the draught-pipe must be reversed. I, however, prefer the doors inside, for the cold damp air of the house, floating near the ground floor, is sucked in and heated. No inconvenience is experienced from dust, as every morning, before the stove is cleaned out, a pint or so of water is poured in at the feeding-door, so as to saturate the ashes before they are drawn out. Coke from the gas-works is the only proper fuel to use. These stoves should be built with 4-inch brick-work and mortar, at the fire-boxes with fire-bricks and fire-clay; and they should not be used till two or three weeks after building, or the brick-work is apt to crack. I find nothing like iron for the roof or top of the stove, as Welsh tiles are apt to crack. A plate of cast iron, nearly three quarters of an inch thick, is necessary. On this a shallow pan, 2 inches deep and 2 feet square, of galvanised iron filled with water, will always keep up a genial moisture in the house.

---

* These stoves will not burn well with a long horizontal draught or flue: 3 feet must be the extreme length.

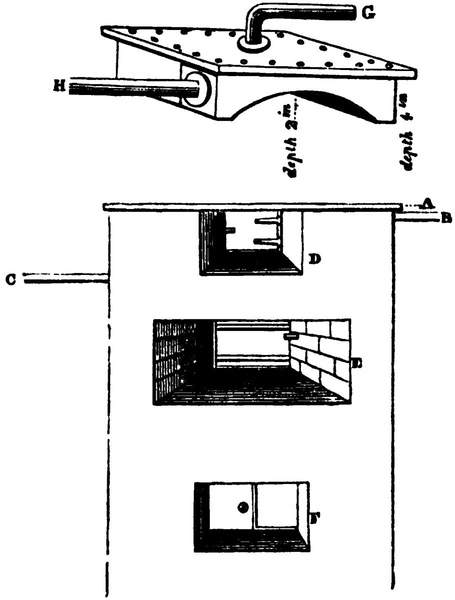
II.

THE ARNOTT STOVE BOILER.

THIS hot-water apparatus, which was figured in the "Gardener's Chronicle" for May 12th, 1849, and the blocks of which have been kindly lent to me by the editor, is perhaps the most economical and efficient ever introduced; it is merely a boiler placed over the fire-box of an Arnott stove, which does its duty most admirably, at a less cost for fitting up and fuel than any boiler I have yet seen in operation.

I have now six in full work. They have been hitherto cast of three sizes—14-inch, 16-inch, and 18-inch. One of 14 inches (14 inches square), which holds just eight quarts of water, is now heating an orchard house 40 feet by 12; it does this well, at a very small cost for fuel (coke). Another 16-inch boiler heats two propagating pits with gutters, each 60 feet long by 6 feet, also most efficiently; and another heats a propagating pit 60 feet long by 6 feet. These two last-mentioned boilers have superseded others which cost four times the amount to "set," and devoured four times the quantity of fuel required by the above very simple form of boiler. When used for heating houses, the feeding- and draught-doors may

FIG. 15.



A, Iron plate. B, Flow-pipe. C, Return-pipe. D, Door over the boiler. E, Feeding-door. F, Ash-pit or draught-door. G, Flow-pipe. H, Return-pipe.*

be outside, although I do not adopt this plan: but the stove should be, if possible, inside, as the dry gentle heat of the stove and the moist heat from tanks or gutters form a perfect combination. These boilers are made by Mr. Hughes, the Iron Foundry, Bishop's Stortford, at a charge of from 30*s.* to 35*s.* each.

---

* The flow- and return-pipes were originally 2-inch; they are now made 3- and 4-inch, and are found to do better.

III.

THE RATIONALE OF ORCHARD-HOUSE CULTURE.

(From an article by the Author in the *Cottage Gardener*, No. 587, pp. 189, 190.)

"I do not think the rationale of the culture of orchard-house trees in pots has yet been given, or perhaps thought of. I am, therefore, tempted to break into the subject; and I hope to show Mr. Errington that this description of culture, although at first much ridiculed by some gardeners, is quite in accordance with garden physiology.

"A fruit tree four or five years old, planted in —say November 1859, will in November 1860 be found in most cases full of blossom buds, and its roots a mass of spongioles or feeders. In November 1861, if undisturbed, it will have fewer blossom buds and more young shoots; and a great portion of the fibrous roots or spongioles around the root-stem, which last year were so abundant, will be dead. The rootlets, or small roots, will be found making their way from the stem of the tree; each rootlet having its fringe of spongioles taking up food farther from home, only because they have exhausted the mass of earth round the stem of the newly planted tree. And so, year after year, it sends out from the extremities of its roots fresh feeders. If the tree be delicate in its habit, like many of our esteemed kinds of fruit trees, the feeders soon get beyond the influence of the sun, take up cold watery sap, and it becomes diseased and unfruitful.

"Let me now give another side of this true picture, premising that all I write is from experience, gathered from 'year to year,' and however dull, still necessary to illustrate my orchard-house culture.

"Let us, therefore, again plant a tree four or five years old in November 1859; and, instead of allowing it to remain undisturbed, take it up with all its fibres in November 1860, and replant it with a small quantity of fresh compost. In November 1861 let us again take it up. As far as my experience has yet gone, a portion of the spongioles produced in 1860 will be found decayed, but a fresh crop, induced by the removal and the fresh compost, will have sprung forth; so that the roots of the tree are still a mass of fibres or spongioles, and its branches with short annual shoots on them full of blossom buds; and so from 'year to year,' if the tree be removed annually, the roots will always be young, near home, and easily fed.

"The fruit-garden may be thus completely under control. If small fruit trees are wanted, remove them annually. If larger but still very fruitful trees are required, remove them biennially. If large trees are wished for, to be kept within bounds by the pruning-knife only, remove not at all, neither root-prune, but allow your trees to grow vigorously; and if in a highly favourable soil and climate they will, in the course of years, bear large quantities of fruit.

"We now come to trees in pots. I have just examined one of my trees in a 13-inch pot, in which it has been, without shifting, seven years. It was top-dressed (as it has been annually) in October 1858, by taking out the earth about half-way down the pot from the surface, and replacing it with fresh compost, ramming it down with great firmness. The compost just removed seems to be quite exhausted, for every part of it is permeated with small fibrous roots, the greater portion of which seem to be dead or dying; so I now take it out with its mass of spongioles which have done their work, and replace it with some fresh compost, leaving a circular mass of rootlets all round the root-stem* of the tree untouched. These rootlets (if the tree be top-dressed in October) will immediately commence to put forth feeders; so that in October 1860 the compost will be again found to be thoroughly exhausted. It will thus, I trust, be seen that the spongioles, or principal feeders, near the root-stems, are but temporary in trees planted in the open ground;

---

* That part of the tree whence the roots proceed.

but may be made annual, to a certain extent, by the annual removal of the tree.

"By cultivating the tree in a pot, and removing it, you *force* it to be annual; and the tree, being thus supplied annually with fresh feeders and fresh food, becomes healthy, fruitful, and vigorous. It has not to ramble for its food, and therefore may be likened in its comfortable state to a plump Devon ox; while a fruit tree uncared for is something like a wild buffalo in a barren country.

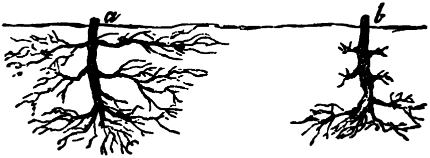
"The vine-dressers in some parts of the South of Europe seem to have for a long time known that the fibrous roots of the vine are annual; for they take away the earth from their vine stocks in winter, with all the exhausted spongioles of the preceding season, let it lie in a ridge between the rows till spring, and then replace it with some manure. The root-stem promptly puts forth its feeders, and the grapes are thus brought to high perfection. I remember perfectly well seeing the operation of taking away the soil from the vines, and, not knowing the 'reason why,' feeling much surprise at what appeared to me so barbarous a custom.

"To return to orchard-house trees. There is nothing in gardening to be compared to their culture when the rationale of it is fully understood. Not only is there an annual crop of feeding-roots from above, but from below also. I have before me a stout tree seven years old taken from its pot, and find three or four large roots coiled round the bottom part of the ball of earth and fibrous roots. From these annually are put forth numerous spongioles, which make their way through the holes at the bottom of the pot. If left undisturbed some of these become roots of considerable size, and by making their way too deeply into the border draw up too much food, giving such vigorous growth as to make the tree unfruitful. I now, therefore, have the trees lifted twice in June, and twice in July, the first and the last week in each month. This prevents the roots going deeply into the border, and induces a host of spongioles to push forth, spreading themselves under the pot, and on the surface of the border. If orchard-house trees be planted in the borders instead of being kept in pots, the necessity of annual removal and giving fresh compost to the roots, equivalent to the annual top-dressing given to potted trees, will be at once apparent.

"With orchard-houses, either lean-to or span-roofed, properly ventilated at the sides, ventilation freely given, and regular syringing, no failure can take place. All kinds of fruits can be cultivated in them; and when one sees, as I often have, the fine crop of pears, plums, peaches, &c., grown on well-fed little trees, no surprise will be felt at the enormous extent this kind of culture has now arrived at. One of my first orchard-house trees, a Pitmaston Orange Nectarine, is now twelve years old; it has always remained in the same 13-inch pot without being shifted, and is sturdy, healthy, and more full of blossom buds than ever.

"P.S.—I have to-day (December 21) received a letter from an American friend, which, bearing as it does on annual root-pruning, seems of much interest. He was last year deputed, by the United States Government, to travel in Europe to look into the details of vine culture. The following extract alludes to the subject:—'I have your letter on a matter which interested me greatly last winter while in Zante and Cephalonia, where I found they not only took away the earth from the vines, from nine to twelve inches in depth, but also cut off all the roots within six inches of the surface close to the stem. These stumps of roots will, of course, throw out plenty of feeders into the earth, which is drawn around them again after being fertilised by exposure to the atmosphere, and by the usual quantum of stable manure

FIG. 16.



a. Roots of Zante vine, unpruned. b. Roots of Zante vine, as pruned and exposed during the winter.

spread over and mixed with it. Now, if the practice of the Greeks with the Zante currant is in accordance with sound physiological principles, I can save at least 500 dollars an acre in the formation of my vineyard, by dispensing with the deep rich soil, having depth only for drainage, and putting my manure annually near the surface, to feed the spongioles formed annually.'

"It will be seen, from this extract, that what has been considered here a new doctrine and practice, viz. that of annually taking away the surface roots of orchard-house trees in pots, and giving them fresh food, a practice the result of pure accident, is very ancient, and has, probably, been followed by the Greek vine-dressers from time immemorial."

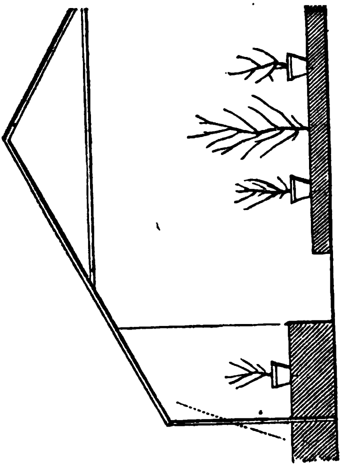
IV.

THE ORCHARD HOUSE OF THOMAS BEWLEY, Esq.,

At Blackrock, Dublin.

(Extracted from the *Quarterly Review*, for October, 1859.)

"I AM more than ever convinced of the superiority of fruit-houses, especially in this island (Ireland), over walls. I have adopted the opinion that glass and timber are cheaper than brick and stone; that is to say, that a given quantity of the superior fruits can be produced in a fruit-house



costing a less sum than walls producing the same quantity, even without taking into consideration the much greater certainty of crops from the trees being protected, but assuming the walls to give fair average crops. My new house is all timber and glass, with a triple span roof, 84 feet long and 60 wide, the centre span 1½ feet higher than the two side ones. In this centre division is a bed 19 feet wide, and here I have planted my pyramidal pears, most of which are now 10 feet high, splendid trees and full of bloom. They are 6 feet apart. Altogether there are 16 of these in the house, and about 100 peach, nectarine, plum, and apricot trees. The effect is very beautiful, all being now in bloom; some of the pears are magnificent. The sides of the houses are glazed down to the ground, the sashes being hung on central pivots, and all readily opened. I have more light than I ever saw in any other house, and the ventilation appears all I could wish; and these I take to be two cardinal points for producing good fruit. I propose to grow vines to all the pillars inside; strawberries in the side borders; and I know not what else I may try, for I still have much room to spare. I am keeping an account of the temperature, to compare with that of the open air. In February the mean height was 3° above the outside, and in March 5½°; and it will doubtless be greater during summer and autumn. One reason that induced me to erect so large a structure was an almost uniform want of success with the pears; for although I took great care in protecting them when in bloom, yet late frosts almost always caused the fruit to drop, so that scarcely one tree in ten gave a fair crop. My house is handsome and well finished, indeed rather too well, for it has cost me about *500l.* There is a good deal of extra work, which might be saved, and I have little doubt the same-sized building might be erected for 1*s.* 9*d.* per square foot of ground covered.

“Structures like these are as much for ornament and pleasure as for the cultivation of fruit. The dry air of a spacious orchard house is most agreeable in the autumn, winter, and spring months for invalids. An hour's sunshine sends the thermometer up to 60°. Early spring and winter-blossoming shrubs may be introduced, but not evergreens, for to keep the latter in health they must be liberally watered, and this destroys the elasticity and dryness of the air which makes it so agreeable to breathe. Some plants of the Chimonanthus fragrans in large pots will give their sweet flowers in January. Jasminum nudiflorum and Forsythia viridissima, although quite leafless when in bloom, have a very gay appearance. The flowers are yellow. Those of the Tartarian Honeysuckle (Lonicera tatarica) are white or bright red, and show in the orchard house in February. Banksian roses, the Mezereon, the early Dutch Honeysuckle, and many other plants, may be grown in pots, and will bloom freely from January to March, with only a very small quantity of water."

I may add to these early blossoming shrubs, Magnolia conspicua, with its flowers of pure white; Magnolia Lennè, with large flowers of a deep rich purple; and Magnolia Norbertiana, with large white flowers tinted with purple. These all give their flowers very early in spring, and in the climate of the orchard house bloom in great perfection.

In a recent communication from Mr. Bewley he says: "I often see, or fancy I see, a very close analogy between animals and plants. Now the harder *we* work by day the more thorough is the rest we require at night; and is it not so with plants? So I say, give plenty of air by night to the orchard-house trees, to allow them to *rest* in a low temperature; and, having rested, work them hard by day, by diminished air and consequently higher temperature. I believe few are aware how much heat plants will bear in broad daylight, if they be allowed perfect rest at night.

"Surely it is the close warm damp atmosphere at night that draws our plants, not heat by day; we meet with no such thing in nature analogous to our houses at night, as they are usually treated. Out of doors the air is always in motion, radiation must cause it to be so.

"I do not think 90 to 100 degrees of heat would injure my trees on a sunny day; and our practice is to give plenty of air all night, to syringe early, and, as the sun gets somewhat high and the excess of moisture evaporated, to reduce the air until the house gets hot and to keep it so all day, thus taking advantage of bright days to push on our fruits, in fact to 'make hay while the sun shines.' When somewhat cool, we syringe again and open every light. This is my plan for obtaining good wood and high-flavoured fruit. And is it not as near an approach to nature as possible?

"I annex a comparative statement of the temperature, from February to September inclusive, of the external air and in my orchard house, by which you will observe that during these eight months the latter has the advantage of nearly 5¼° over the former. Is not this equal to nearly five degrees of latitude?

	Outside temperature.	Inside temperature.
	Degrees.	Degrees.
February . . .	43·62	47·35
March	46·03	50·43
April	45·61	50·75
May	50·84	59·30
June	58·05	64·71
July	64·38	68·82
August . . .	60·45	64·30
September . .	55·66	60·30
Mean . .	53·08	58·24

"I must merely add, that in dull sunless weather there is very little difference between inside and outside temperature."

V.

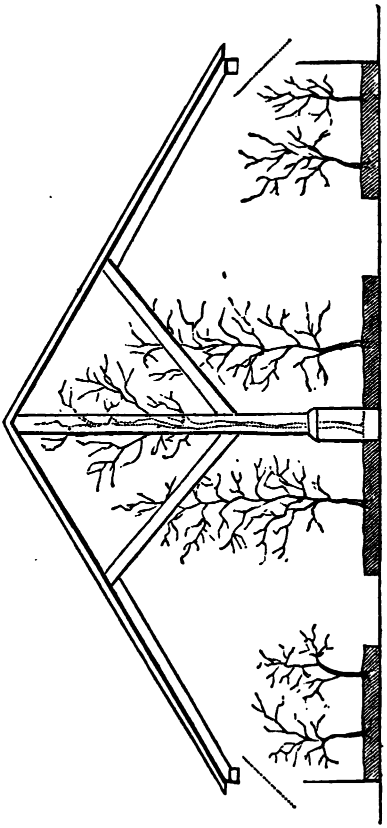
THE ORCHARD HOUSE OF DR. SAMUEL NEWINGTON,

AT TICEHURST, SUSSEX.

THE orchard house of Dr. Samuel Newington, at Ticehurst, Sussex, of which figure 18 is a sectional view, is a very agreeable light and airy structure. It is 80 feet long, 30 feet wide, 15 feet high in the centre, and 5 feet at the sides. Side ventilation is effected by sashes, 3 feet by 2 feet 6 inches, swinging on pivots. It has two shutters at the apex of the roof to let off heated air. The central border is 10 feet wide, in which were planted three rows of trees, peaches and nectarines. Those in the middle row are standards with clear stems 6 feet in height, the side rows are half-standards, so that this border has quite an orchard-like look. The side borders are 6 feet wide, in each of these are two rows of bush trees in pots plunged. The standards and half-standards in the centre have made most vigorous growth, and will soon be large stout trees. I fear, however, that they will become too large, and that some difficulty will arise in pruning the trees and thinning the fruit.

I have thought it necessary to describe this house as well as that of Mr. Bewley, to let my

FIG. 18.



Transverse Section of Orchard House of Dr. Samuel Newington, at Ticehurst, Sussex.

readers see how orchard houses may be varied in their construction, and made useful and agreeable in the smallest gardens as well as in those of the opulent.

VI.

COMPOTES.

These delicious French open tarts are made as follows. Take half a pound of flour, six ounces of butter, and a little pounded loaf sugar; rub and mix thoroughly with an egg well beaten. Roll the paste into a thin crust, and then take hoops of tin about three inches in diameter and one inch deep; place your crust in these as when making a common tart (from which it differs in having upright instead of sloping sides, and no top crust); the side and bottom crust to be of equal thickness. These tin hoops (which are bottomless), with the crust in them, should then be placed in the oven on a broad sheet of the same metal till the crust be half-baked. Stew the fruit with sugar till half-cooked, then fill the half-baked crusts in the tin hoops with it. Sprinkle pounded loaf sugar over it, and finish baking. You will then have a tart without upper crust, full of juice and fruit, with which our English tarts will bear no comparison, for the fine aroma of strawberries, raspberries, cherries, and mirabelle plums is fully preserved. They should be taken out of the hoops as soon as cool, and eaten while fresh, as the juice soon soddens the crust.

This receipt was given to me by a French "chef de cuisine," and has answered admirably.

VII.

A SELECT LIST OF

FRUITS ADAPTED FOR ORCHARD-HOUSE CULTURE

PLACED IN THE ORDER OF THEIR RIPENING.

The sorts marked thus * may be selected by those requiring only a few trees.

Apricots.

Musch Musch.
Large Early.
*St. Ambroise.
*Kaisha.
Blenheim.
*Royal.
*Peach.

Nectarines.

Bowden.
*Downton.
*Elruge.
*Hardwicke Seedling.
*Rivers's Orange.
*Violette Hâtive.
White.
Early Newington.

Peaches.

*Red Nutmeg.
*Early York.
Acton Scott.
*Early Grosse Mignonne.
*Précoce de Savoie.
Pêche Abec.
Grosse Mignonne.
*Noblesse.
*Royal George.
Barrington.
*Walburton Admirable.
Late Admirable.
*Bourdin.
Desse Tardive.

Dessert Plums.

*Early Favourite.
Early Prolific.
*De Montfort.
Denniston's Superb.
*July Green Gage.
Transparent Gage.
*Green Gage.
*Jefferson.
*Purple Gage.

*Reine Claude de Bavay.
Guthrie's late Green.
Guthrie's Tay Bank.
*Coe's Golden Drop.
Ickworth Impératrice.
*Late Black Orleans.

Kitchen Plums.

*Early Orleans.
*Kirke's.
*Victoria.
*Prince Englebert.
Pond's Seedling.
*Autumn Compote.
*Belle de Septembre.

Cherries.

*Empress Eugénie.
*Belle d'Orléans.
*Knight's Early Black.
*May Duke.
*Archduke.
New Royal.
Royal Duke.
Duchesse de Palluau.
Black Eagle.
*Elton.
Bigarreau Napoléon.
Bigarreau.
*Reine Hortense.
*Florence.
Coe's late Carnation.
*Late Duke.
Belle Magnifique.
Morello.

Figs.

Early Violet.
White Marseilles.
Brown Turkey.
White Ischia (for forcing).

Pears.

*Doyenné d'Été.
*Jargonelle.
Pius the Ninth.
Seckle.
*Colmar d'Été.
Louise Bonne.
Gansel's Bergamot.
*Beurré Superfin.
Beurré Rougé.
Crassane.
Doyenné Gris.
*Marie Louise.
*Thompson's.
Van Mons (Léon le Clerc).
*Glou Morceau.
Beurré d'Aremberg.
Passe Colmar.
*Winter Nelis.
Easter Beurré.
Beurré de Rance.
*Josephine de Malines.
*Bergamotte d'Esperen.
*Prince Albert.

Grapes (for the Common Orchard House).

*Early Malingre.
Prolific Sweetwater.

Grove End Sweetwater.
*Muscat St. Laurent.
*Royal Muscadine.
*White Romain.
Purple Fontainebleau.
*Esperione.
*Black Hamburg.
Chaptal.
*Muscat de Sarbelle.

Grapes (for the Forcing Orchard House).

Chasselas Musqué.
*Purple Constantia.
*White Frontignan.
*Muscat of Alexandria.

Apples.

Calville Blanche.
Newtown Pippin.
Northern Spy.
Reinette du Canada.
Melon Apple.

Apples for the North.

*White Juneating.
*Irish Peach Apple.
*Cox's Orange Pippin.
*Ribstone Pippin.
*Golden Pippin.
Golden Reinette.
*Van Mons Reinette.
Coe's Golden Drop.
*Sturmer Pippin.

Strawberries.

May Queen, very early.
Princess Frederick William, early.
*Keen's Seedling.
*Seedling Eliza.
Sir Harry.
*Carolina Superba.
Ingram's Prince of Wales.
*British Queen.

INDEX.

Almond, 98.
Aphides, 123.
Aphis, black, 76.
——— powder, 124.
Apple, 93.
——— sorts, 93.
Apricot, 31.
——— in borders, 42.
——— caterpillar, 130.
——— compost for, 30.
——— potting, 32.
——— as an ornamental tree, 43.
——— pruning, 34.
——— retarding, 42.
——— trees for decoration, 37.
——— sorts, 43.
——— as pyramids, 44.
——— summer pinching of, 35, 45.
——— planting out of, 46.
——— distance apart of, 47.
April, 128.
August, 132.

Borders, 10.
——— mixture for, 10.
Boxes, 30.
Buds, leaf, and fruit, 51.

Camellia, 27.
Charcoal fires, 129.
Checking growth, 57.
Cherry, 74.
——— houses for, 76.
——— sorts, 75.
——— summer pinching of pyramids, 77.
Chirimoya, 115.
Compost, 30.
Compotes, receipt for making, 155.
Coverings, 27.
Currants, 94.
Cut-down trees, 53.

December, 135.

Estimates, 11, 20, 23.

February, 127.
Fig, 76, 120.
——— in cellar, 79.
——— management, 78.
——— sorts, 79.
Free ventilation, 58.
Fruit spurs, 53, note.

Glass recommended, 7.
Grape, 85.
——— bushes, 86.
——— forcing, 88.
——— pruning, 87.
——— sorts, 89.
Granadilla, 117.
Guava, 116.

Implement for top dressing, 40.
Insects, to keep off, 70.
——— to destroy, 123.

January, 127.
July, 131.
June, 131.

Lee-Chee, 116.
List of fruits, 156.
Loquat, 116.

Maiden trees, 31, 52.
Mango, 117.
Mangosteen, 115.
Manure, liquid, 37.
March, 127.
May, 129.
Mulberry, 94.

Nectarine, as an ornamental tree, 60. For treatment, see *Peach*.

Nectarine sorts, 66.
November, 134.

October, 131.
Orange, 27, 108.
—— black fungus, 114.
—— compost for, 112.
—— Maltese, 111.
—— St. Michael's, 111.
—— Tangerin, 109.
Orchard house, origin of, 1.
—— forcing, 98.
—— hedge, 104.
—— large span-roofed, 24.
—— lean-to, 5,
—— poor man's, 4.
—— rationale of culture, 142.
—— small span-roofed, 16.
—— tropical, 105.

Path, sunken, 9.
Peach, 47.
—— as an ornamental tree, 60.
—— "en cordon oblique," 60.
—— miniature trees of, 29, 64.
—— pinching, 50.
—— pruning, 54.
—— pyramidal, 60.
—— retarding, 59.
—— sorts, 66.
—— summer pinching of bushes, 54.
—— summer pinching of pyramids, 62.
—— planting out of pyramids, 64.
Pear, 80.
—— house, 82.
—— —— for winter pears, 85.
—— sorts, 84.
Pinching off, 34, 54.
Plantain, dwarf, 118.
Plum, 68.
—— house, 70.
—— sorts, 69, 73.
—— summer pinching of pyramids and bushes, 74.
Pomegranate, 116.
Pots, 29.
Potting, 32.
Pruning, 34.

Red spider, 58, 125.
Rose apple, 118.

Sapodilla, 119.
September, 133.
Shoots, shrivelling of, 39.
Strawberry, 94.
—— compost, 94.
—— potting, 95.
—— sorts, 95.
Succession houses, 13.
Sulphur and lime, 125.
Sweet lime, 119.
Syringing, 36.

Thinning fruit, 37.
Tiffany, 128.
Tobacco smoke, 123.
—— water, 123.
Top-dressing, 38.
Trees, feeding from below, 39.
—— stations for, 39.
—— number wanted, 41.

Ventilators, 18.
—— netting for, 102, 130.

Water, 28, 36, 57.

Year 1st, 33.
—— 2nd, 34.

THE END.

LONDON: PRINTED BY SPOTTISWOODE AND CO., NEW STREET SQUARE.